Secondary students using expert heuristics in the analysis of digitalized historical documents

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Secondary Students Using Expert Heuristics in the Analysis of Digitalized Historical Documents

by

Daniel W. Stuckart

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy
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Dedication

This dissertation exists because of my late mother, Lil, and my father, Bill. My earliest memories are your encouragements to do my very best in school. It worked so well—I never left. Thank you for giving me the fortitude to survive and prosper.
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I feel blessed to have made many acquaintances and found many mentors through the years. The committee members were always helpful with their time and instruction. Candace Roberts bravely joined the group in the last year; her English background provided valuable insights into the representations of text. Jim White offered technological expertise as well as years of guidance as one of the university’s finest instructional technology professors. Howard Johnston, although I never had the pleasure of participating in one of his courses, became an advocate and friend during my entire graduate career. And lastly, I thank Michael Berson, who served as a major source of inspiration.

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Secondary Students Using Expert Heuristics in the Analysis of Digitalized Historical Documents

Daniel W. Stuckart

ABSTRACT

In time, more historical documents have become accessible through various technological modes including the Internet, CD-ROMs, and local databases. Teachers are now able to infuse a rich variety of resources into lessons with relative ease. This study measured expert historian heuristics in secondary students engaged in analysis of technologically-enhanced historical documents relating to women in the early United States republic. Nine 10th grade Advanced Placement world history students from an urban high school in the southeastern United States were assigned randomly to one of three conditions: paper historical documents, HTML historical documents, and HTML historical documents with simulated, limited Internet access. Using a think-aloud protocol developed by Jonassen et al. (1999), the qualities and frequencies of expert historian heuristics were measured.

The findings support and enhance previous research related to how secondary students learn history while performing a task using primary and secondary source documents and the effects of hypermedia technology.
Most of the time, students engaged in a simplistic read-and-react pattern, except for two participants who recognized greater levels of subtext. The two students account for slightly more than 50% of all heuristics. Moreover, the students in general failed to perceive nuances between the documents, engaged in presentism, and viewed history as a uniform expansion of civil rights and increased opportunities. However, all the participants achieved some level of understanding indicating that women enjoyed fewer rights than their white, male counterparts.

In the HTML groups, the participants moved within and between the documents with greater frequency and non-linearly. While in the Internet group, forays to the simulated Internet invoked a high proportion of expert heuristics and resulted in statements of clear understanding. The results imply that computer technologies promote authenticity and learner control. Furthermore, expert heuristics can help students manage information from the Internet. In addition, the paucity of heuristics exhibited by most subjects suggests a lack of prior knowledge and inexperience with historical documents. This may be a result of the way history is taught in the schools. The results are discussed within the framework of previous research and the cultural wars.
Chapter One

The Introduction to the Study

The roots of historiography in western culture trace back to the ancient Greek historians, Thucydides and Herodotus (Leinhardt, Stainton, Virji, & Odoroff, 1994; Voss & Carretero, 1994). Thucydides’ search for truth was later expanded by Aristotle’s notion of *antiquarian research*, meaning the use of data to arrive at truth. Nonetheless, the search for past truth has always been a complicated affair where one examines evidence through the attitudes and biases of the present. In the not-so-distant past, learning history was exclusively viewed as an exercise in content, mainly memorizing facts and dates (Lee & Ashby, 2000). Today however, many educators believe that history is a highly complex endeavor invoking a multitude of cognitive processes (Barton, 1994; Craver, 1999; Foster & Padgett, 1999; Kobrin, 1996; Lee & Ashby, 2000; Levstik & Barton, 1997; Shemilt, 1978; Stearns, 1998; VanSledright & Brophy, 1991; Wineburg, 1991a; Yeager & Davis, 1994). Additionally, studies addressing the notion of historical understanding are becoming more plentiful, but research on the effects of computer technology and historical understanding is nearly nonexistent. With the continued integration of technology in our schools, many voices are calling for investigations into effective practice and pedagogy (Berson, Lee,
Context of the Problem

In the technology-driven investment days of the 1990s and early 2000s, schools poured billions of dollars into the purchasing and upgrading of technology (Software & Information Industry Association, 2002). Critics point out that massive technology expenditures preceded any conclusive body of research justifying the effectiveness of technology in teaching and learning (Berson et al., 2001; Jones & Paolucci, 1998; Mendels, 1999). Moreover, Whitworth and Berson (2003) report that much of the meager research focusing on the integration of technology and the social studies is anecdotal, perhaps because we have yet to realize technology’s full potential in the social studies (Bolick, 2002). At the same time, more recent studies offer tantalizing clues to best practice (Lee, 2002; Milson, 2002; Saye & Brush, 1999). This study aspires to add to the empirical evidence guiding social studies educators in their incorporation of technology in the classroom.

The literature review begins with an examination of social studies and technology research findings with a particular emphasis on history practice and pedagogy. Next, a discussion ensues of the three major research strands concerning historical understanding, which are (1) students making sense of a socio-cultural construct we call history; (2) using history as a means for an end; and (3) processing history like expert historians do. Along the way, various meanings of historical thinking, and a framework for historical
understanding, labeled historical literacy, are explored. The subsequent section presents scholarship on expertise, in general, and specific heuristics of expertise in history. Following that, the researcher investigates primary source documents and digitalized historical resources. In the next part, the use of documents to construct historical knowledge proceeds in the context of the constructivist learning theory. Constructivism and the teaching and learning of history do not proceed in a value-free context; instead, they are major players, and sometimes, incidental casualties of the insidious cultural wars. Subsequently, hypermedia research findings suggest that computer technologies are a tool for facilitating knowledge construction. And finally, the researcher presents the purpose of the study together with specific research questions.

In the method and procedure section, the investigator presents the qualitative research design. Following that is an analysis of the think-aloud protocol. The researcher argues for the use of the think-aloud protocol in the study and, at the same time, describes an expert-novice approach. The implications of this approach are discussed as well. Next, the selection and inclusion of documents are presented followed by the development of the research instrument. Validation of the instrument ensues together with data collection procedures and analyses.

*The Problem and Purpose*

The convergence of schools adopting computer-related technologies, the availability of tens of millions of digital historical documents, and the need
for understanding effective teaching and learning using technology beseech for guiding qualitative and quantitative research studies. This inquiry attempts to measure the effects of computer-enhanced historical documents on the manifestation of expert historian heuristics. In particular, it scrutinizes the behavior of secondary students assigned randomly to one of three groups: paper historical documents, HTML documents, and HTML documents with simulated, limited Internet access. The first group offers the control while the other two are treatments.

This investigation provides the context for addressing the following research questions:

1. What expert heuristics are evident when high school students engage in a task requiring the examination of digital historical sources?
2. What expert historian heuristics do students use when navigating a simulated Internet to perform a prescribed task in history?

Answering these questions may provide valuable clues to integrating historical documents into the curriculum because qualitative data provide a rich dimension to understanding. However, it is impossible to say whether the detection of expert heuristics equates with a heightened sense of learning or understanding.

Definition of Terms

Heuristics: guiding principles that help individuals make sense and elucidate patterns from evidence,
**Contextualization:** heuristic where historians directly relate and draw inferences to notions of geographic place and time,

**Corroboration:** heuristic where historians check important details between or among documents,

**Sourcing:** heuristic where historians examine attribution before reading the document leading to hypotheses,

**Expertise:** the condition of achieving a high level of skill and knowledge in a particular domain,

**Primary Source Documents:** first-hand historical accounts that may include reports, maps, photographs, letters, diaries, posters, and recordings,

**Secondary Source Documents:** works that interpret or analyze historical periods or phenomena that may include textbooks and encyclopedias,

**Resources**

This study contains a participant survey, a two-part pretest, ten paper historical documents, a video record, parent/student permission slips, and an expert validation survey. Moreover, the research designed and authored an HTML document infusing the 10 historical documents. The participants in the treatment groups used a personal computer with a Microsoft Windows® operating system equipped with Forefront WebWhacker® technology.

**Variables**

**Dependent Variable:** Expert historian heuristics
Independent Variables: High school students interpreting paper historical documents (Control), HTML historical documents (Treatment A), and HTML historical documents with simulated Internet access (Treatment B)

Control Variables: Reading ability and computer experience

Summary and Organization

The nexus of schools investing billions of dollars in technologies, the availability of millions of digital historical documents, and the paucity of research to guide the process of integrating the documents into social studies curricula provides the rationale for the study. Chapter 2 offers a literature review, which examines nine strands: (a) technology and the social studies, (b) notions of historical thinking, (c) studies on expertise, (d) primary source documents, (e) digital historical resources, (f) constructivist learning theory, (g) public policy toward learning history, (h) hypermedia, and (i) learning and teaching standards. Chapter 3 describes the methods and procedures, specifically participant selection, think-aloud protocol, the coding process, the research instrument, a description of the documents, and analyses. Chapter 4 elaborates the coding process, presents the descriptive statistics, and reports the findings. In chapter 5, the results are discussed within the context of previous research. At the same time, new findings are presented together with conclusions and recommendations for further research.
Chapter Two

Review of the Literature

This study purports to measure expert historian heuristics in secondary students analyzing computer-enhanced historical documents. The researcher examines the literature related to the effectiveness of technology and the social studies with an emphasis on teaching and learning history. This is followed by a discussion of the theoretical constructs underlying the research into historical thinking.

Technology and the Social Studies

In a recent review of over 300 articles, reports, chapters, and books, Whitworth and Berson (2003) conclude that an overwhelming majority of scholarship concentrates on accessing content rather than innovative uses of technology in the social studies. While recent studies suggest that there may be a positive effect of technology on the social studies, few qualitative and quantitative studies exist to guide effective teaching and practice. Even scarcer are studies involving the integration of technology with the history domain.

Saye and Brush (1999) report that technology and expert teacher guidance can create an authentic learning environment for historical inquiry, which can pique student interest, provide alternative perspectives, and facilitate
knowledge acquisition. In a southeastern United States high school, the researchers built a problem based learning (PBL) unit where multimedia scaffolds aided one of two groups; the other group followed a traditional, teacher-directed lesson. The researchers state that despite organizational problems, the computer groups exhibited obvious enthusiasm. In a similar vein, positive significant differences were found in the multimedia group in areas of substantive uses of knowledge, persuasive arguments, dialectical arguments, and satisfaction. However, as the researchers warily note, it is not possible to attribute these differences to the multimedia or to some other factors.

In a study on ancient Egyptian history conducted in a 6th grade social studies classroom, Milson (2002) chronicles three generalizations about integrating the WebQuest technique:

*Finding 1: Students have differing perceptions of the value of Internet sources and print sources, but many find print sources preferable to Internet sources.*

*Finding 2: Students’ strategies for gathering and organizing information are initially characterized by a quest for the ‘Path-of-least Resistance,’ but the teacher can successfully guide students to more productive approaches.*

*Finding 3: Students of varying academic ability levels can conduct inquiry-oriented investigations, but they approach and perceive the value of such investigations differently.* (pp. 342-346)
A WebQuest is an inquiry activity consisting of five parts: Introduction, Task, Process, Evaluation, and Conclusion. The teacher, using a template, develops an idea and posts web pages to a server specifying the parameters, including links to important sources. The students access the information on the Internet to complete the task (Dodge, 1995). Based on his observations, Milson (2002) concludes,

These results are largely positive for those promoting inquiry learning and cooperative learning. The implications for the use of the WebQuest technique, however, are less clear. The findings suggest that computers motivate some students and that the WebQuest approach can be used successfully as a structure for inquiry learning. Additionally, students in this study gained an understanding of the variety of historical sources available on the Internet and the need to consider the accuracy and relevance of such sources.

As will be suggested later in this present study, expert historian heuristics applied to web pages may provide tools for critically evaluating content on the web. Subsequently, future studies may measure the correlation between the level of expert historian heuristics and preference for printed material versus web-based documents.

Another study examines the relationship between pre-service social studies teachers’ pedagogical content knowledge and how they teach with digital historical resources (Lee, 2002). The researcher concludes that, although the participants were able to demonstrate personal understandings,
they failed to make use of that knowledge pedagogically, contradicting those who believe that subject matter knowledge is adequate for effective teacher preparation. Perhaps the beliefs and practices of those who train teachers help to explain this study’s outcome because, in general, social studies college faculty report lower-level uses for technology, and they are evenly split in their opinion about integrating technology into their programs versus teaching technology as a distinct skill (Berson, Mason, Heinecke, & Coutts, 2001). Interestingly, there appears to be a grassroots movement afoot to demand technology integration in instruction from the students at both the university and secondary levels (Diem, 2002a). Nonetheless, the integration or combination of technology and the social studies merits deeper study.

Social studies and technology advocates have been calling for more quantitative and qualitative studies for several years, yet few exist, and even fewer exist in the history domain.

Notions of Historical Thinking

Many cognitive scientists support the theory of domain specificity of knowledge. Although what constitutes a domain is debatable, the perspectives emanating from those domains are authentic. In other words, each domain of knowledge such as history contains certain and specific attributes which invite unique organizations of that knowledge (Levstik & Barton, 1994). History is different from most disciplines because the narrative form emphasizes content, context, and interpretation while most other subjects are taught and organized around the concepts of rules and
examples (VanSledright & Brophy, 1991). This uniqueness helps to drive views of what history education should look like.

Increasingly, history education is viewed as a powerful force necessary for preserving American society. Recent efforts to harness that force are evident in political rhetoric. While politicians preach the gospel of American ideals and look to biographical sketches for sources of inspiration (Bush, 2002), critics point out that this view often leads to a curricular approach emphasizing factual coverage over the cultivating of critical thinking skills (Stearns, 1998). Supporting this argument, scholars are approaching what it means to learn, understand, and use history, an evolution toward a framework called historical literacy. The idea of historical literacy is slowly seeping into the intellectual mainstream. Currently, a project is under way to define exactly what that framework is. Initial indications appear that historical literacy is a process encompassing myriad research directions, all meant to meet the challenges of living in the 21st century (The Woodrow Wilson National Fellowship Foundation, 2003).

Thus far, three major research strands support historical literacy. The first discussed is a line of study that describes how students make sense of a socio-cultural construct called history. The second is a discourse on the uses of history. And the third defines history as what historians do.

*Children making sense of history.*

One area of research has made use of observing children engaged in historical processing. One study suggests that as kids (and adults for that
matter) make sense of history, it is constantly reinvented in their minds by the present social processes (Wineburg, 2000). Moreover, kids may find history subject matter boring precisely because teachers fail to develop challenging narratives to a sanitized version of social progress, one that is relevant to what kids think (Levstik, 2000). One can parse the corpus of research focusing on kids making sense of history into the following areas: historical significance, historical time, historical empathy/perspective-taking, and historical inquiry.

Historical significance is a socio-cultural construct. When middle grade students were presented with various images and asked to choose the most significant, they overwhelmingly chose images related to social and political phenomena in the United States. They justified their choices by citing themes of increasing opportunities and expanding rights. The focus of the study was to examine student thinking about what they believed to be historically significant or, put another way, a meaningful past (Barton & Levstik, 1997). Another study addressed what a group of middle-school students believed to be historically important, how they viewed historical time, and how they conducted historical judgment. The researcher conducted six in-depth interviews and concluded that the students consistently erred in reconstructing a unit on U.S. Colonial history because they lacked a purpose for studying history and demonstrated a severe deficit in prior knowledge (VanSledright, 1994).
Other research focuses specifically on the notion of historical time. Western history is almost exclusively arranged and conceptualized along a chronological continuum. The problem with using the chronological date as a standard for measuring some sort of historical understanding is the implication that one must learn a human-contrived date schemata in order to have an understanding of time (VanSledright, 1994). Another approach to detect understanding of historical time is to discern differences among images. The juxtaposition of images suggests a sequential order among the images and a referent independent of modern chronology. Children are able to create “important historical understandings prior to—and to some extent independent of—their use of dates and other aspects of the adult temporal vocabulary” (Barton & Levstik, 1994).

Barton (1998a) studied children’s understanding of historical time in Northern England using a series of pictures. He discovered that elementary children are capable of accurately placing photos in a sequential order. Moreover, students understood the conceptualization of dates and words as annotators of time. Students made their decisions based on knowledge gained in and out of school, their own histories, as well as the history of individuals in their families.

A successive, comparative study involving students from Northern Ireland and the United States revealed cultural differences in views of historical knowledge and historical time. Students in the United States tended to think of knowledge as the product of verbal transmissions through successive
generations while students in Northern Ireland viewed knowledge as a weighing of evidence. Furthermore, U.S. students viewed historical change as a logical, linear progression. On the other hand, the Northern Ireland students tended to analyze change within societal contexts, and hence, were able to develop multiple perspectives (Barton, 1998b).

The failure of elementary students to develop multicultural perspectives in the United States may be a product of inadequate teacher training (Ravitch, 2000). Elementary students are often exposed to superficial and simplistic perspectives of history (Yeager & Davis, 1994). Recent evidence suggests that this may be changing (Levstik, 2001). Developing multiple perspectives is a major goal of historical perspective taking, also called empathy in other parts of the world.

Certain scholars believe that in order to promote constructivist history, one must develop empathetic feelings about people and their concomitant reactions to past events. Foster (1999) describes six organizing strands to promoting historical empathy: (a) developing an understanding of why people acted in a certain manner; (b) developing a grasp of chronology and context; (c) seeking out and analyzing available evidence; (d) promoting an appreciation of important people, events, and the surrounding culture; (e) nurturing an understanding that the past is different from the present; and (f) an acknowledgement that human nature is multifaceted and complex.

American educators embrace the term “perspective taking” over “empathy,” which implies a relationship to the affective domain. There is much debate
concerning whether the development of historical empathy is a true cognitive phenomenon. Yet, it may be a key component in the development of historical inquiry.

In the general sense, inquiry is the search for truth or knowledge. Inquiry differs from other historical cognitive processes because it envelops a wider range of expectations and behaviors. Students exercise significant control over their learning. Foster and Padgett (1999) believe that historical inquiry requires that students ask authentic questions, choose appropriate evidence, assess differing perspectives, and arrive at logical conclusions. They offer nine practical considerations to facilitate historical inquiry in the following paraphrase: (a) the teacher decides how much freedom the students have in choosing a topic; (b) the teacher considers how to enhance student interest in the inquiry process; (c) the teacher assists the students in formulating researchable projects; (d) the teacher considers how much material to provide for research; (e) the teacher aids the students in extracting appropriate information from the selected sources; (f) the teacher monitors student progress; (g) the teacher aids the development of critical appreciation of the evidence; (h) the teacher prescribes a delivery format; and (i) the teacher determines the amount of time to be spent on the project (pp. 358-363).

Inquiry is a common strategy in a social studies classroom and is also known as problem-based learning (PBL). Inquiry acts as a means to learn history, and according to some proponents, history itself is a tool for achieving loftier goals.
Using history as a means to an end.

Learning history is often seen as a means to encourage democratic discourse in a pluralistic society and to promote critical thinking skills in individuals. In this sense, history is viewed as a means to achieve desirable societal and personal goals.

Perhaps the major justification for the social studies discipline is the notion of creating and preparing an effective citizenry in a democratic society (International Society for Technology in Education, 2000). In a position statement, the National Council for the Social Studies postulates that “An effective citizen: Has knowledge of the people, history, and traditions that have shaped our local communities, our nation, and the world” (National Council for the Social Studies, 1994a). Nearly mimicking that position, President Bush recently spoke about the importance of student citizens learning the “ideals” forming the foundation of our country. He announced several initiatives to promote the learning of history, including a National History Day that will showcase electronic copies of historical documents through the National Archives and Records Administration (Bush, 2002).

A popular trend of politicians and media is to cite the ignorance of citizens in “knowing” history. The logic follows that if citizens do not know the how, why, and evolution of our democracy, our hallowed system cannot be preserved. In President Bush’s speech, he cites a fact that one in five high school seniors thought Germany was an ally of the United States in World War II (Bush, 2002). As Wineburg (2001) points out, this pattern of
ignorance extends for at least 85 years, and probably longer, predating television and radio. Yet, our political system survives and is probably stronger than ever. It persevered through the Great Depression of the 1930s and a contested presidential election in 2000. Nonetheless, as a measure of success, the “knowing” of history by an overwhelming majority of Americans is a failure. What about other measures of success?

Besides the failures of knowing history, voter apathy receives significant reporting. If voter participation is a measure of success, we are failing. The citizens least likely to vote are those that have most recently left a social studies classroom (Levstik, 2001). One can argue that the social studies, in general, and history, specifically, have not produced the ideal, effective citizen. Nonetheless, the political system in the United States flourishes.

Another argument for the use of history is that it enhances and expands critical thinking skills in individual learners. Learning history has shifted from rote memorization of facts to construction of knowledge. Critical thinking in history draws on a variety of cognitive processes and physical performances. Craver (1999) provides a list of critical thinking characteristics in the learning of history:

- Explore different ideas, think divergently, take risks, and express opinions. These generalities include the ability to speculate, infer, hypothesize, entertain alternative scenarios, pose questions, make predictions, and think metaphorically.
• Examine multiple possibilities of meaning and determine the cultural and psychological nuances and complexities in a text.

• Recognize and comprehend ambiguities in a text and understand archaic vocabulary.

• Understand the importance of context and perspective in a source and be able to examine internal and external evidence to determine its validity.

• Discern the main ideas in a historical source.

• Make connections between the source and one’s own idea, experiences, and knowledge.

• Make generalizations that are supported by historical evidence.

• Discern themes and patterns in a set of primary sources.

• Communicate one’s ideas clearly and persuasively in oral and written communication.

• Collaborate with peers in group interaction assignments. (pp. 21-38)

Some view history as a means for preserving democratic values in a pluralistic society and, still others, believe that learning history leads to the development of critical thinking skills. Yet another perspective focuses on the learning of history as what expert historians do.
History as what historians do.

All domains come replete with experts who share common attributes with experts of other domains. However, while the attributes may be similar, they do not transfer across disciplines. In other words, an expert in plumbing most likely does not have expertise in quantum physics (and vice versa). One area of thought concludes that it is beneficial to have the learners of history act more like the experts of history. In this regard, understanding the heuristics of expert historians can foster curricular designs meant to promote that desired behavior.

Studies on Expertise

Formal study of expert behavior originated in the 1960s. The majority of the studies reveals certain characteristics that are robust across all domains. Glaser and Chi (1988) identify seven characteristics of expert behavior:

1. Experts Excel Mainly in Their own Domains. Essentially experts have a great deal of specific domain knowledge, but probably not in others. Therefore, you would expect an expert in one domain to act like a novice in another unrelated domain.

2. Experts Perceive Large Meaningful Patterns in Their Domain. Having a deep understanding of the knowledge base of a particular domain, allows experts to recognize routines and subroutines. Moreover, the recognition is not related to heightened perception.

3. Experts are Fast: They Are Faster than Novices at Performing the Skills of Their Domain, and They Quickly Solve Problems with Little
Two explanations emerge to explain why experts are faster than novices. First, experts spent many hours in practice becoming proficient. Applying the skill becomes automatic, freeing up memory for other endeavors. Second, experts are able to see solutions to a problem without going through a lengthy search; it is an immediate process based on extensive experience.

4. **Experts Have Superior Short-Term and Long-Term Memory.** An experts’ capacity for recall appears expansive because many of the tasks are automatic, thus freeing up more resources.

5. **Experts See and Represent a Problem in Their Domain at a Deeper (More Principled) Level than Novices; Novices Tend to Represent a Problem at a Superficial Level.** While experts sort knowledge around general principles, novices tend to group knowledge by simplistic features.

6. **Experts Spend a Great Deal of Time Analyzing a Problem Qualitatively.**

Experts ponder a solution and add constraints before attempting a solution, creating a mental model. Novices delve aggressively to seek resolution, bypassing deep, qualitative deliberation.

7. **Experts Have Strong Self-Monitoring Skills.** Experts are more aware of their errors, better judges of difficulty levels, and ask questions of difficult texts. Novices, on the other hand, ask more questions on the facile materials.
Sternberg (1998) articulates expert operational characteristics on ability tests, qualities one would expect expert historians to employ while engaged in an inquiry-based exercise. He refers to experts:

(a) having large, rich schemas containing a great deal of declarative knowledge about a given domain, in the present case, the domains sampled by ability tests; (b) having well-organized, highly interconnected units of knowledge about test content stored in schemas; (c) spending proportionately more time determining how to represent test problems than they do in search for and in executing a problem strategy; (d) developing sophisticated representations of test problems, based on structural similarities among problems; (e) working forward from given information to implement strategies for finding unknowns in the test problems; (f) generally choosing a strategy based on elaborate schemas for problem strategies; (g) having schemas containing a great deal of procedural knowledge about problem strategies relevant in the test-taking domain; (h) having automatized many sequences of steps within problem strategies; (i) showing highly efficient problem solving; when time constraints are imposed, they solve problems more quickly than do novices; (j) accurately predicting the difficulty of solving particular test problems; (k) carefully monitoring their own problem-solving strategies and processes; and (l) showing high accuracy in reaching appropriate. (p. 133)
Another body of research focuses on individual differences in expertise. Expertise is not an innate phenomenon unique to individuals. Rather, it is a process of due diligence where one acquires the expertise in about ten years’ time. Remarkably, the ten-year rule seems to apply across all domains (Ericsson & Charness, 1994). The development process differs among individuals in key ways, much like one would expect in learning differences:

(a) rate of learning (which can be caused by the amount of direct instruction received, amount of problem solving done, amount of time and effort spent in thinking about problems and so on), and from (b) asymptote of learning (which can be caused by differences in the numbers of schemas, organization of schemas, efficiency in using schemas, and so on).

Ultimately, such differences will represent a distinct genetic-environmental interaction for each individual (Sternberg, 1998, p. 135).

**Expertise and history.**

Many cognitive theorists believe expert behavior is domain specific; one would expect an expert in a certain field or endeavor to behave in a manner specific to that endeavor. The key to expertise appears to be the ability to organize knowledge. Experts tend to organize knowledge around a relatively few grand ideas such as theories, themes, principles, and fundamental concepts. Most of the research is based on differences between novice and
expert behavior along a continuum while the subjects perform complex tasks (Chi, 1981; Niemi, 1997).

Researchers at UCLA launched a study to examine expert-novice historian behavior using primary source documents. The task required students to write essays about the major themes contained in the sources and also to integrate any prior knowledge about the themes. An assessment rubric was created based on how expert historians approached the essay. The rubric ranged from novice high school students to expert history professor performances (Baker, Freeman, & Clayton, 1991). Perhaps the most comprehensive expert-novice history study to date involves the work of Samuel S. Wineburg.

*Identifying historian heuristics in an expert-novice design.*

The study of history involves three main elements: the establishment of facts, the making of inferences, and the formulating of opinions (Craver, 1999). However, the teaching and learning processes are ambiguous and demand value decisions, the inclusion and exclusion of materials and ideas, as well as the reduction and rebuilding of notions (Kobrin, 1996; Wineburg & Wilson, 1991). In a sense, the foundation of historical understanding rests on the deconstruction and reconstruction of ideas. Yeager and Davis (1994) recognize teacher importance in stimulating historical understanding; they advocate that history teachers advance “their instruction beyond an inventory of facts (knowing that) to historical analysis (knowing how)” in order to model appropriate cognitive processes (p. 23). Nonetheless, historical
understanding is a poorly defined concept, and historians differ on exactly what it means. Wineburg and Wilson (1991) represent a sparse field of researchers who attempt to measure historical inquiry and thinking.

A unique characteristic of history is that the outcomes are always apparent, but the process of arriving at the outcomes is open to interpretation and involves a reconstruction of ideas. Wineburg’s study explored how “expert” historians differ from “novice” students in their reconstruction of American history using eight primary sources from the Battle of Lexington. The researcher qualitatively analyzed historical inquiry as the individuals reasoned aloud. In this way, Wineburg was able to construct a continuum of expertise. In addition, he administered an assessment test to study the relationship between content knowledge and the heuristics of historical understanding. And lastly, he employed quantitative analyses describing the frequencies of cognitive behaviors and assessment test performance.

Heuristics are guiding notions that help individuals make sense and elucidate patterns from evidence. Wineburg articulated three heuristics: corroboration, sourcing, and contextualization. In the first heuristic, he distilled patterns where expert historians corroborated facts and discrepancies among documents while the students, on average, did not corroborate. He devised an operational construct using “lookbacks,” meaning he quantitatively measured the number of times a participant returned to other documents. He viewed this as evidence of corroboration. Sourcing, a second heuristic, referred to the participants’ searching for the historical attribution
before reading the document. Historians tended to do this nearly without exception while the students did this about one-third of the time. Students who did not source the documents exhibited confusion and offered simplistic analyses. The historians also tended to develop hypotheses based on sources before the actual reading of the documents. The researcher determined that sourcing was a critical component for deciphering the value of the text. A third heuristic, contextualization, placed a document within the parameters of space and time. The historians constructed timelines and geographic reference points from direct evidence contained in the documents and by drawing inferences. The students did not infer meaning from much of the evidence, and instead viewed the evidence as a collection of facts (see Table 1).

Conclusions to Wineburg’s study.

Evidence suggests that historical understanding may involve the building of specific learning structures for independent events because unique circumstances and features predicate each event. For the experts, it was not an automatic task; rather it was a rigorous building process involving analysis and synthesis. Students as novices, on the other hand, exhibited and articulated ideas suggesting that the process was more about clear choices. They viewed the selection of the trustworthiest document as a right and wrong choice rather than an intellectual compromise. This may also explain why they engaged in a paucity of “lookbacks.” Moreover, students did not perceive a document’s worth as connected to sourcing.
Table 1

Operational Constructs of Expert Historian Heuristics (Wineburg, 1991a)

<table>
<thead>
<tr>
<th>Heuristics</th>
<th>Operational constructs</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sourcing</td>
<td>Subject examines attribution and conjectures a hypothesis before reading the document.</td>
<td>“I’m about to read something by John Adams; I don’t think presidents cared about woman rights.”</td>
</tr>
<tr>
<td>Contextualization</td>
<td>Subject places events in chronological sequences or in tangible spaces and ascertainment the terms of their occurrences.</td>
<td>“back then” “at that time” “It's always been that way.”</td>
</tr>
<tr>
<td>Corroboration</td>
<td>Subject checks important details among documents, i.e., lookbacks.</td>
<td>“I read in the other document...”</td>
</tr>
</tbody>
</table>

Wineburg cautions that the results are neither conclusive nor determinate. It will never be possible to definitively state whether the described differences are a function of historical understanding, background, syntactical difficulty, language comprehension, or something else. However, the design of the study provides valuable clues about expert historian behavior. It is important to recall that one-half of the historians had little knowledge of American history, yet they approached the challenge in a similar manner and with like heuristics, implying that previous knowledge was not a prerequisite. In terms of novice students, one overarching theme
was evident: Constructing historical understanding was independent of historical knowledge; more facts did not produce better heuristics.

As a follow-up to Wineburg’s study, Rouet, Marron, Perfetti, and Favart (1998) attempted to measure a degree of source knowledge in undergraduate students in the United States, and in a second experiment, French graduate students. They reported that all students have some degree of source knowledge, particularly evident when the researcher alerted the students that some documents were trustworthier than others. Furthermore, the history novices tended to rely nearly exclusively on content when evaluating usefulness while the specialists used a variety of criteria such as content, source, and task parameters. These findings supported Wineburg’s assertion that expert historians developed a representation of subtext that allowed them to factor out bias (Wineburg, 1991b).

**Summary of Research on Historical Thinking**

Research on historical thinking can be organized around three research strands: children making sense, uses of history, and expert historian behaviors. Children making sense of history recognizes multiple perspectives including historical significance, time, empathy, inquiry, and a rigorous process of analysis and synthesis. Uses of history fall under the auspices of safeguarding liberties and promoting personal intellectual growth. Expert historians use heuristics to guide their schemata constructions, i.e., corroboration, sourcing, and contextualization. The examination of primary source documents can offer insights into the cognitive processes.
Primary Source Documents

Primary sources can promote student awareness of historical ambiguities and lead to greater historical understanding (Yeager & Davis, 1995a). In addition, primary sources can promote the development of critical thinking skills as the students construct historical meaning (Craver, 1999; Kobrin, 1996). Exactly what constitutes a primary source is a matter of temporal juxtaposition. Valid primary source documents require appropriate content and context. The content includes authentic documents, reports, maps, photographs, letters, diaries, posters, and recordings created by those who participated in or witnessed the events of the past (Schamel, 1998).

Craver (1999) suggests a content classification schema based on the type of transmission: written, visual, oral, and electronic. Subsequently, the content can only be a primary source in context of a specific topic. Context means that the source originates contemporaneously to the topic. Hence, a primary source becomes secondary when it is not used in the same general time frame as the topic. For example, the writings of the ancient Roman historian, Livy, are secondary sources when the topic is about the precursors to the Roman Republic. However, they are also primary sources in the context of the attitudes and ideas emanating from the Roman Empire. As information technology continues to permeate all aspects of society, the accessibility of primary source documents increases and the calls for studies examining the effects of these sources on the learning of history also swells (Berson, 2002; Lee, 2002).
Digital Historical Resources

Digitalized historical documents embody more than primary sources such as images, artifacts, and texts; they also include secondary and tertiary sources: critiques, historical narratives, presentations, commentaries, and the like. In significant ways, these resources differ from non-digital ones in that they are easily accessible, subject to manipulability, amenable to searches, and can be part of both linear and non-linear organizational structures (Lee, 2002). The proliferation of digitalized historical resources is evident by the expansive number of social studies’ articles devoted to identifying Internet sources, which to the critics, represent an abrogation of responsibility for guiding effective pedagogy and practice (Whitworth & Berson, 2003). Learning theories give credence to successful learning and teaching.

Constructivist Learning Theory

Germinating from the cognitive revolution of the 1960s, constructivist philosophy reflects a paradigmatic shift from learning as a product of the environment to one where mental structures take precedence. To constructivists, knowledge is not transmitted; rather it is built from action and experience. Therefore, reality is a product of the mind instead of an external reflection. Symbols become the tools for constructing knowledge. While in the traditional view, symbols are a true representation of the world. According to constructivism, meaningful learning happens in a setting that is authentic, reflective, active, constructive, and cooperative. Teachers become facilitators of knowledge invoking multiple perspectives and inductive
processes. Traditional teaching, on the other hand, often takes a teacher-centered approach that is deductive in nature (Jonassen, Peck, & Wilson, 1999). These generalities are the foundation for different perspectives within constructivist learning theory.

As the field of cognitive psychology shifted from positivism to cognitive models of understanding, constructivism emerged as a viable learning theory. Early suppositions, included Vygotsky’s descriptions of tools and symbols and Piaget’s stages of child development, were first attempts to explain the acquisition of knowledge as something that occurred within humans, not some external truth or reality (von Glasersfeld, 2000; Vygotsky, 1978). Knowledge was acquired through deliberate action challenging old assumptions of what constituted knowledge (i.e., ontology) and what knowledge should be valued (i.e., epistemology). Doolittle and Hicks (2003) identified four philosophical tenets supporting constructivist theory:

Tenet 1: Knowledge is not passively accumulated, but rather, is the result of active cognizing by the individual.

Tenet 2: Cognition is an adaptive process that functions to make an individual’s cognition and behavior more viable given a particular environment or goal.

Tenet 3: Cognition organizes and makes sense of one’s experience, and is not a process to render an accurate representation of an external reality.
Tenet 4: Knowing has its roots in both biological/neurological construction and in social, cultural, and language-based interactions. (pp. 76-77)

Within the constructivist camp there exists varying degrees of constructivism commensurate with acceptance of the various tenets. The broadest interpretation involves the social constructivist approach and embraces all four tenets. That is followed by the radical constructivist approach, which accepts tenets one through three. And finally the cognitive constructivist theory, that focuses only on tenets one and two. Accepting the tenets tacitly accedes that knowledge is a highly individualistic endeavor and reality is a malleable spectrum of possibilities (Doolittle & Hicks, 2003).

*Social, radical, and cognitive constructivism.*

The least conservative form of constructivism is social constructivism and embraces all four philosophical tenets. Social constructivists believe that one can never know a true external reality. Additionally, knowledge is a subjective relativistic enterprise that builds upon social interactions. In this sense, people build knowledge structures together, each arriving at a highly individualistic understanding (Doolittle & Hicks, 2003).

Like social constructivism, radical constructivism posits that an external reality exists and is unknowable. Unlike social constructivists, radical constructivists perceive individuals cognizing in isolation, therefore embracing only tenets one through three. Contact with others produces an additional environmental factor, rather than a solution to the thinking process
The ultimate goal of a radical constructivist is to produce efficient thinking (Doolittle & Hicks, 2003).

What separates cognitive constructivism from the other two general forms are two important factors. First, cognitive constructivists embrace only tenets one and two. Second, and perhaps more importantly, they also assume that a knowable reality exists. The second factor has led many to criticize cognitive constructivism as the charlatan of the constructivist perspectives (Doolittle & Hicks, 2003). Unlike other constructivist views, cognitivists believe that an objective reality exists that can be reconstructed in internal mental frameworks. Hence, memorizing dates, facts, and specific events are important for this development. Much of the literature ignores this perspective because it is antagonistic to the underlying constructivist ideals (Fosnot, 1996; Larochelle, Bednarz, & Garrison, 1998; Steffe & Thompson, 2000). The rift between the social and radical advocates versus the cognitive camp mirrors the epic struggle engulfing much of the political and educational world over who controls knowledge and will be discussed later.

Constructivism, technology, and the social studies.

Since the inception of hypermedia as a learning tool, constructivist learning theory has emerged as a major theoretical foundation for investigation because social studies experts recognize the power of active-learning strategies (Ayersman, 1996; Berson et al., 2001; Katra & White Cameron, 2000; White & Walker, 2000). Doolittle and Hicks (2003) present
a case for constructivism in the social studies linking the four philosophical tenets to six theoretical principles:

*Principle 1: The construction of knowledge and the making of meaning are individually and socially active processes.*

*Principle 2: The construction of knowledge involves social mediation within cultural contexts.*

*Principle 3: The construction of knowledge is fostered by authentic and real-world environments.*

*Principle 4: The construction of knowledge takes place within the framework of the learner’s prior knowledge and experience.*

*Principle 5: The construction of knowledge is integrated more deeply by engaging in multiple perspectives and representations of content, skills, and social realms.*

*Principle 6: The construction of knowledge is fostered by students becoming self-regulated, self-mediated, and self-aware.*

*Corollary: Teachers should serve primarily as guides and facilitators of knowledge construction, not dispensers of knowledge.* (pp. 83-85)

In a study exploring the effects of technology and a constructivist class environment on the roles of professors and undergraduate history students, Milman and Heinecke (2000) appear to support some of the theoretical principles. Reform-minded professors were able to successfully shift from dispensers of knowledge to facilitators. Furthermore, the task became student-centered and evidence suggested that students socially constructed
knowledge as they built websites using digital primary sources. Students embarked on a process of learning history. The process provided a rich dimension that affected both the students’ learning and the professor’s teaching, “in ways that lecture courses do not allow” (p. 556).

Calls for the use of technology as a means to reform social studies practice and enhance active learning have existed for some time (Bennett, 2002; Berson, 2002; Berson et al., 2001; Danker, 2000; Diem, 2002b; Diem, 2002a; Ehman, 2002; Glenn, 2002; Lee, 2002; Milson, 2002; Risinger, 2002; Saye, 2002; Saye & Brush, 1999; Scott & O'Sullivan, 2000; White, 2002; Whitworth & Berson, 2003). Making the transition from theory to practice is a precarious endeavor. Doolittle and Hicks (2003) ground six strategies in research:

Strategy 1: Teachers and students should be prepared to implement technology as a tool for inquiry.

Strategy 2: Teacher should use technology to create authenticity, which facilitates the process of student inquiry and action.

Strategy 3: Teacher should use technology to foster local and global social interaction such that students attain multiple perspectives on people, issues, and events.

Strategy 4: Teachers should facilitate student knowledge construction by using technology to build on students’ prior knowledge and interest.
Strategy 5: Teachers should enhance the viability of student knowledge by using technology to provide timely and meaningful feedback.

Strategy 6: Teachers should cultivate students’ academic independence by using technology to foster autonomous, creative, and intellectual thinking. (pp. 88-92)

The strategies also align with technology guidelines offered by CUFA, a professional organization comprised of social studies university faculty, graduate students, and other advocates of the social studies:

- Extend learning beyond what could be done without technology.
- Introduce technology in context.
- Include opportunities for students to study relationships among science, technology, and society.
- Foster the development of the skills, knowledge, and participation as good citizens in a democratic society.
- Contribute to the research and evaluation of social studies and technology. (Mason et al., 2000, Introduction section, ¶ 2)

Based on theoretical constructs and professional assertions, the nexus of technology, constructivism, and the social studies advocates effective practice and pedagogy for the 21st century. The key to understanding this juncture depends on the underlying philosophy of the teacher, i.e., the place on the constructivist spectrum between empiricism (cognitive constructivism)
and rationalism (solipsism) (Molebash, 2002). In the middle of this spectrum are the relativistic positions like the radical and social constructivists. The present study is designed to meet the first three philosophical tenets of constructivism, hence reflecting a radical constructivist approach. High school students evaluate digital, historical documents from various perspectives in a process of making meaning. In the context of radical constructivism, the present study attempts to bridge the gap between theory and practice, providing a blueprint for limited technology integration in the history classroom and to stimulate future research.

**Summary of Constructivist Learning Theory, Technology, and the Social Studies**

Over the course of the twentieth century our conceptualization of educational technology shifted from a traditional purveyor of knowledge where students learn *from* it to productivity tools where students learn *with* it (Jonassen et al., 1999), although the process has been bumpy at best (Tyack & Cuban, 1995). Computer technologies, with their ever-increasingly sophisticated capabilities, offer students an opportunity to make meaning and to showcase what they learned. Moreover, a constructivist perspective of computer technologies allows us to delve deeper into those technological attributes that foster meaningful understanding. Constructivism occurs along a continuum ranging from a positivist, cognitive view acknowledging a real, knowable reality to an extreme rationalist, solipsistic view where all knowledge is constructed in the mind, a true reality can never be known, and
all knowledge is valuable. Somewhere in the middle lies relativism as espoused by the social and radical constructivists. For purposes of the present study, the theoretical framework supports a relativistic approach based on the tenets of radical constructivism.

Public Policy Toward Learning History: The Cultural Wars

The fundamental disagreement between the cognitive constructivists and the other constructivist positions is a microcosm of a much larger struggle over the very heart and soul of education, sometimes referred to as the cultural wars. It is a war waged at the highest levels of our government where public policy and billions of dollars are at stake. It is a war that polarizes people into two camps, those that advocate a cultural literacy approach to education (e.g., reflected in cognitive constructivism) and those who believe education should be inclusive of multiple perspectives (e.g., reflected in radical constructivism and social constructivism). Although cultural wars have probably been fought since the beginning of civilization, this particular war became entrenched following the release of (A Nation at Risk, 1983). A seemingly innocuous statement about the social studies was really the opening salvo to a ferocious battle over control of the history domain:

The teaching of social studies in high school should be designed to:
(a) enable students to fix their places and possibilities within the larger social and cultural structure; (b) understand the broad sweep of both ancient and contemporary ideas that have shaped our world; and
(c) understand the fundamentals of how our economic system works and how our political system functions; and (d) grasp the difference between free and repressive societies. An understanding of each of these areas is requisite to the informed and committed exercise of citizenship in our free society (A Nation at Risk, 1983, Recommendations, ¶10).

The economic failings of our economy in the 1970s and 1980s created an education backlash much like the Soviet launch of Sputnik in 1959, igniting a cultural war over educational reform. Education was viewed as part of the problem and a probable solution. According to this view, education had gone astray: mediocrity prevailed in most schools with inflated grades, trivial course offerings, apathetic students, and unqualified teachers. At the same time, other industrialized nations were economically usurping the United States because their students were scoring higher on standardized tests and foreign businesses were gaining a competitive edge, especially in the Pacific-rim Asian countries. Conservative calls for reform rallied around the flag with a call for a return to core classes and core values (Cheney, 1987; Hirsch, Kett, & Trefil, 1987; A Nation at Risk, 1983).

Although few would disagree about what constitutes core classes, defining core values in a richly diverse nation presents a dilemma: What are those values and how do you teach them? Defining our nation’s epistemology became a highly charged political affair. Hirsch et al. (1987) provided a list of everything a high school graduate should know in the history domain.
Critics charged that the entire process was biased against minorities and any other group that did not subscribe to an Anglo-Saxon domination view of history (Nash, Crabtree, & Dunn, 1997; Symcox, 2002). The debacle continued into the 1990s with the failed attempt to adopt national history standards. Conservatives scuttled the standards because they viewed it as liberal revisionism, a distortion of facts to correct for our nation’s past sins, a sort of feel-good history (Cheney, 1994; Frazee & Ayers, 2003). The logic followed that multiculturalism produced a culture of cynicism, which in the end, turned off young people to politics and civics engagement (Rochester, 2003). While the war rages on to this day according to the ebb and flow of political fortunes, implications for the teaching and learning of history often hinge on where one falls along the political spectrum.

The conservative view of history as a collection of knowable facts and a liberal perspective of multiple points of view underlie the two main pedagogical thrusts: traditional rote memorization versus process. Describing the process of learning history based on constructivist theory has come under attack as anti-intellectualism (Frazee & Ayers, 2003; Rochester, 2003). Ravitch (1985) believes that social studies has run so amok with multiple perspectives, that history deserves a separate domain entity in our school systems. This in itself presents a fallacy because having more history knowledge does not equate with better teaching (Lee, 2002), and evidence suggests that students are turned off by learning narrow views of history (Levstik, 2001). This present study embraces multiple perspectives, a
process approach. The experience of American women in the post revolutionary period was not monolithic; rather it was varied and sometimes contradictory. Therefore, developing multiple perspectives enhances students’ meaning making of a critical historical period. Radical constructivism provides the theoretical foundation. The essence of connecting theory to practice in this study is predicated on the following question: What unique capabilities do computer technologies offer for meaning making in a multiple perspective approach to learning history? The answer may exist in previous investigations on the learning effectiveness of computer technologies.

Research on Hypermedia

Hypertext is electronic text that is linked to other text within a web-based platform while hypermedia is the inclusion of images and/or audio (Berson et al., 2001). This study, in the treatment conditions, digitalizes primary source documents into a hypermedia format, consisting mainly of hypertext with one image. Additionally, treatment B allows limited, simulated Internet access. Immediately, it appears that because treatment B participants can access more information, logically it follows that there is a greater propensity to increase expert historian heuristics. Simply put, participants in the treatment B group will have more information to source, contextualize, and corroborate. This is not necessarily true. More information does not equate with positive outcomes or better learning (Berson et al., 2001; Postman, 1992; Roszak, 1986; Stoll, 1995). In fact, depending on the learner, the very
opposite may be true. A learner may experience cognitive overload (Zhu, 1999). Hence, an examination of the literature related to hypermedia attributes may suggest both the unique capabilities of hypermedia to facilitate knowledge construction and discern differences between learner types.

Hypermedia research matured from simple analyses of features on learning outcomes to complex designs incorporating learner differences.

_Early research._

Reflecting earlier views of educational technologies as transmitters of knowledge, initial research efforts tended to study the effects of hypermedia providing information on learning outcomes. Ayersman (1996) synthesized the research from its inception in the late 1980s to the middle of the 1990s, and despite a preponderance of flawed studies, reported general positive results for teaching and learning. The following is a discussion of those findings with an emphasis on possible insights relevant to the present study.

Early research often compared hypermedia as an instructional strategy with other methods (Ayersman, 1996). Many of these studies utilized vastly different approaches to teaching and learning, obscuring whether it was truly the hypermedia causing a difference or some pedagogical or human trait factor. When other studies embraced learning theories predicated on cognitivist principles, four strands emerged within the research.

In the analyses of comparative studies grounded in social interaction theories before 1996, most of the researchers reported either no significant differences or significant differences favoring the hypermedia strategy
The four general strands were: (a) hypermedia and affective measures, (b) hypermedia and individual differences, (c) hypermedia features and user responses, and (d) hypermedia’s impact on performance and skill level (p. 503).

In terms of affective measures, Ayersman (1996) reported that studies generally cited positive perceptions and attitudes in hypermedia-based activities. Moreover, when used as a learning tool, students claimed a sense of heightened control and motivation (p. 505). When individual differences are analyzed, usually in the form of different learning styles and levels of computer experience, Ayersman documented positive benefits for both linear and nonlinear forms of organization. Nonlinear organizations promoted a more global approach to learning compared to linear arrangements (p. 506). He suggested that providing navigational options might allow different learners to choose styles most beneficial to them. When Ayersman examined hypermedia features and user responses, the results were inconclusive. In general, it may be beneficial to offer more than one path to a node within a hypermedia program (p. 510). In the final strand that Ayersman chronicled, performance, he reported that some students often had trouble with nonlinear organizations of information until they became familiar with hypermedia formats. Furthermore, not all students chose nonlinear formats even when they became fairly proficient with hypertext (p. 511). Regardless of structure, results overwhelmingly indicated hypermedia’s positive effects on performance. When he published his findings, hypermedia and widespread
computer use was still in its formative stages. Certainly today more students are exposed to hypermedia than in Ayersman’s range of studies. Likewise, more recent studies continued the trend from simplistic comparisons to sophisticated designs incorporating learner attributes and pedagogical considerations.

Recent studies.

Like the earlier research on hypermedia, more recent investigations suggested that hypermedia favored positive outcomes in web-based learning environments. At the same time, research designs advanced beyond comparing hypermedia to traditional formats. Rather, they tended to infuse learner characteristics with elements of pedagogy. The sophistication of recent studies sometimes reflected a dynamic interaction between the two. Additionally, the latest studies recognized the role of hypermedia as a learning tool instead of merely a purveyor of information. The following review examines recent studies in two broad categories: attitudinal measures and design characteristics.

Student attitudes toward hypermedia.

Recent investigations yielded positive attitudes in learning with hypermedia (Brinkerhoff & Glazewski, 2000; Brinkerhoff, Klein, & Koroghlanian, 2001; Burke, Etnier, & Sullivan, 1998; Farrell & Moore, 2000-2001; Gimenez & Saenz de Jubera, 2001; Mack, 1995; Pedersen & Liu, 2002; Savenye et al., 1996; Tait, 1998; Yang, 2000; Zhu, 1999). While some research persisted in reporting simple survey results of attitudes or teacher
observations after students experienced a hypermedia-based learning experience (Brinkerhoff & Glazewski, 2000; Gimenez & Saenz de Jubera, 2001; Tait, 1998; Yang, 2000), others took into account hypermedia features or learner characteristics. Embedding structured or unstructured overviews into hypermedia significantly increased college students’ attitudes (Brinkerhoff et al., 2001). And in another study with undergraduate and graduate university students, the participants indicated statistically significant positive attitudes with fewer nodes of information within a web-based hypermedia environment (Zhu, 1999). College students with greater experience in computer-assisted instruction (CAI) reported favorable attitudes toward hypermedia (Savenye et al., 1996). Eighth grade students developed positive attitudes for a nonlinear arrangement over the linear and search engine options (Farrell & Moore, 2000-2001). When elementary students were assigned to either a learner-controlled or program-controlled group to study the solar system using a hypermedia-based lesson, the learner-controlled group reported favorable attitudes (Burke et al., 1998). In a study examining the attitudes of 4th graders randomly assigned to either linear or nonlinear format groups, Mack (1995) concluded that while moderate positive attitudes toward the hypermedia prevailed in both groups, gaming experience did not produce a significant effect on attitudes. When sixth grade students were randomly assigned to one of three hypermedia scaffolding conditions in a PBL unit on the solar system, the expert modeling aid produced more favorable attitudes toward the expert than the didactic aid
and simple help aid conditions; the expert modeling aid did not diminish the enthusiastic attitudes in general for a PBL design (Pedersen & Liu, 2002). Overall, the newest research bolstered earlier studies proclaiming strong positive attitudes toward learning in a hypermedia-based environment. Furthermore, much of the recent research also continued a trend toward more sophisticated designs, something Ayersman (1996, p. 34) noted when he stated, “the research has already shifted slightly toward more sophisticated examinations; intricately detailed studies that often use creative, multiple-level analyses to investigate the process of learning with hypermedia.”

An overview of recent research on hypermedia-based learning.

Much of the later research on hypermedia-based learning focused on three general conditions either combined or independent that acted as the manipulated (independent) variables: grade level or experience, psychological factors, and multiple hypermedia-learning contexts. The outcome measures (dependent variables) represented a wide range of possibilities including organizational preferences, achievement, motivation, control, time spent in program, level of interaction with the program, and miscellaneous findings. The most typical scenario was to study a specific grade level or experience in multiple hypermedia conditions.

Effects of grade level or experience in a hypermedia environment.

Investigations of grade level and computer-related experience showed significant positive effects. Young children preferred linear formats while older students chose nonlinear arrangements (Mott & Klomes, 2001).
Younger students performed better on a post-test using a linear path with a scaffolding aid (Burke et al., 1998). Likewise, eighth grade students in a nonlinear condition felt more in control and performed significantly better (Farrell & Moore, 2000-2001). Librarians in the United Kingdom reported that secondary students using multimedia encyclopedias experienced more control and enhanced motivation (Wishart, 2000).

Results for university students learning in a hypermedia context were inconclusive. While more computer experience correlated with increased learning (Brinkerhoff et al., 2001; Savenye et al., 1996), Tait (1998) reported no significant differences in exam results compared to the traditional lecture-based group (control). In a qualitative study involving six university student volunteers, Yang (2000) observed that novice learners felt enhanced control learning with hypermedia. Although the research was contradictory regarding the effectiveness of college students learning in a hypermedia environment, it also suggested that hypermedia did not negatively impact learning.

Levels of computer-related experience affected outcome measures as well. In general, students with greater experience learned more (Brinkerhoff et al., 2001; Ford & Chen, 2000; Savenye et al., 1996) and interacted longer with the hypermedia (Ford & Chen, 2000). It should be noted however, that while time spent in a hypermedia program was a predictor of achievement in one study (Savenye et al., 1996), it did not produce a significant effect in another (Jones & Liu, 2001). Typical of the trend toward more sophisticated research
designs, Ford and Chen (2000) studied the behavior and performance of sixty-five postgraduate students using a hypermedia tutorial program. In addition to levels of prior experience, they also analyzed age, gender, motivation, and cognitive style. The investigators documented significant correlations between prior experience with Internet use and web page construction with test achievement. They also noted that prior experience correlated with approaching the task in ascending order of difficulty. Those with high levels of prior experience returned to viewed pages less often and generally asked for less guidance. Complex studies correlating cognitive characteristics represented another strand in recent hypermedia-based learning research.

*Psychological characteristics investigated in hypermedia learning.*

A general approach to studying the effects of psychological characteristics in hypermedia learning environments involved profiling the participants and immersing them in hypermedia tasks (Baylor, 1999; Chen, 2002; Ford & Chen, 2000; Jones & Liu, 2001; McManus, 2000). The results were uncertain. Baylor (1999) found no significant difference in sensation-seeking behavior and spatial holistic ability factors in affecting perceived disorientation and preferences for linear or nonlinear organizational structures. Additional research chronicled no significant correlation in postgraduate students with field-dependent/field-independent cognitive styles and achievement variables in a hypermedia setting (Ford & Chen, 2000), although in a follow-up analysis, field-dependent learners became confused.
when confronted with too much freedom in a nonlinear arrangement (Chen, 2002).

Other research studies yielded statistical significance. Engineering students with a performance-avoidance goal orientation achieved less using a hypermedia-based learning tool while students with a performance-approach goal orientation scored higher on the unit exam (Jones & Liu, 2001). Furthermore, McManus (2000) suggested that high self-regulating learners achieve poorly in linear formats because it constrains choices. He also noted that medium self-regulating learners learn poorly in nonlinear organizations because of too many choices. The uncertainty of the research results examining the effects of cognitive styles on outcome measures in hypermedia-based learning implies the need for further investigation.

Another general area of research involved assigning participants into one of multiple hypermedia-learning contexts.

*Multiple hypermedia contexts on learning outcomes.*

Later hypermedia studies reflected an advancing maturity in hypermedia research evident from more sophisticated designs. What these later studies had in common were multiple independent variables, sometimes with multiple levels, together with several outcome measures (Brinkerhoff & Glazewski, 2000; Brinkerhoff et al., 2001; Burke et al., 1998; Chan & Ahern, 1999; Farrell & Moore, 2000-2001; Pedersen & Liu, 2002; Zumbach & Reimann, 2001). Inherent in these complex arrangements was the acceptance
that learner individual differences reacted to a broad spectrum of conditions and result in myriad outcomes.

The different learning conditions often reflected the primary attributes of hypermedia. For instance, studying the effects of linear and nonlinear arrangements on achievement and attitudes represented the premise that hypermedia were essentially variations of electronic texts, images, and sounds; which made it different from other representations of text, images, and sounds, especially the traditional book-bound format of text. Furthermore, the power to manipulate these items was precisely the dynamic that researchers hoped to isolate and explain. One would expect the dynamic to change as mainstream learning technologies evolved. Understanding the impact of structural organizations appeared to be the main research thrust.

**Learner control using hypermedia.**

Hypermedia-based learning organizational structures were often linked to learner control (Burke et al., 1998; Farrell & Moore, 2000-2001; Zumbach & Reimann, 2001). Later investigation confirmed earlier research that suggested younger children performed better using a linear pathway even though a majority chose a nonlinear course. Moreover, younger students who moved nonlinearly through the program used navigational aids throughout, were aware that they could jump around, and had more positive attitudes than those students who chose the linear route (Burke et al., 1998). At the same time, the researcher noted that learner control and access to navigation aids had no affect on achievement measures (Burke et al., 1998).
In another investigation, Farrell and Moore (2000-2001) studied the effects of learner control and differing reading abilities on achievement and attitudes of eighth grade students. Although they reported that levels of ability did not produce a significant effect on achievement, they did conclude that higher ability levels and more learner control increased achievement. Learner control was recognized as low for linear organizations and progressed to higher levels with the nonlinear and menu search engine formats. High ability learners did not achieve well in linear arrangements, suggesting that it is not challenging enough for them and may induce boredom while the search engine did show a significant effect on that group.

A recent investigation associated indirectly with learner control was the effects of instructional treatment on multiple aspects of performance: motivation, structural knowledge, argumentation, and factual knowledge (Zumbach & Reimann, 2001). The study authors placed 60 adults into a Strategy, Goal-Based Scenario (GBS), or Tutorial Group and charged each group with the task of developing cogent arguments related to the content of oil spills and the ecosystem. The Strategy group treatment involved a pure hypertext in a nonlinear format accompanied with training in strategy questioning. The GBS group received a nonlinear format as well, but the task was ensconced in an authentic learning situation where the group functioned as news reporters. The Tutorial group acted as the control with seven modules contained in a linear arrangement. The investigators concluded that novices experienced severe problems with pure hypertext in
the Tutorial group. They also reported that the GBS group performed significantly better in structural knowledge, facilitated sub goals better, and interacted more with the program. On the other hand, the Tutorial was effective for conveying factual knowledge and both the GBS and Tutorial groups developed better argumentation. Overall, the authentic mission and nonlinear hypermedia organization of the GBS group generated the best self-directed learning. Another approach to hypermedia features was to add specific types of programs to each of the treatment conditions.

*Multiple variables in hypermedia investigations.*

Another reflection of the growing complexity of research studies was the proliferation of multiple hypermedia independent and dependent variables (Brinkerhoff & Glazewski, 2000; Brinkerhoff et al., 2001; Burke et al., 1998; Chan & Ahern, 1999). The pattern of this later research involved the creation of distinct hypermedia learning conditions, usually predicated on multiple functionalities of hypermedia, combined with learner characteristics and measured against multiple outcomes. Brinkerhoff and Glazewski (2000) studied the effects of hypermedia student and teacher scaffolds on student achievement and attitudes in sixth grade students. In two separate trials with different teachers, they determined that students failed to use hypermedia scaffolds and, in the second trial, the teacher successfully incorporated scaffolding. Although project scores suggested successful implementation of the scaffolds, serious issues arose concerning the validity of the study. For example, the researchers did not employ a control group and they failed to
control extraneous variables related to the two distinct student groups. A more robust study involved the use of hypermedia overviews. Another study examined the effects of computer experience and structured, unstructured, or no hypermedia overviews on achievement, attitudes, and time in the program (Brinkerhoff et al., 2001). Although the overview mode did not influence post-test achievement, it did have a significant effect on attitudes toward the program. Additionally, participants in the structured overview spent more time in the program.

Navigation aids provided hypermedia agents for fifth-grade students where they were combined with learner control characteristics to study performance (Burke et al., 1998). As reported earlier in the learner control section of this manuscript, the investigators reported no significant effects on achievement for the independent variables, except in the case where learner aids were combined with student choice in linear pathways.

Chan and Ahern (1999) investigated activity structures on flow experience, i.e., intrinsic motivation. They ascertained that hypermedia presentation quality enhanced flow experience in low-content relevance activities. However, it did not impact high-relevance activities, suggesting that content relevance is more important to learners than presentation quality. Moreover, they reported that multimedia alleviated boredom for expert students. As technology becomes increasingly sophisticated, future studies will most likely continue the trend toward multiple conditions involving attributes of hypermedia agency.
A summary of recent research of hypermedia learning.

As research endeavors into hypermedia-based learning continued to mature, results indicated many positive outcomes in the best-case scenarios, and in the worst, suggested that hypermedia was not harmful to learning. Most learners preferred nonlinear hypermedia, yet most younger children learned best in a linear format while older persons and high achieving younger kids performed optimally using nonlinear (Baylor, 1999; Brinkerhoff & Glazewski, 2000; Burke et al., 1998; Farrell & Moore, 2000-2001; Mott & Klomes, 2001). Moreover, the freedom to navigate in nonlinear arrangements confused certain types of learners such as field-dependent learners, yet alleviated boredom and enhanced the sense of control with high achievers and people with other psychological traits such as high self-regulating learners (Baylor, 1999; Chen, 2002; Jones & Liu, 2001; McManus, 2000). Students also learned more when there were fewer links conditions and smaller information nodes (Zhu, 1999).

Hypermedia motivated students to learn (Chan & Ahern, 1999; Ford & Chen, 2000; Wishart, 2000). One severely underreported phenomenon is gender; females exhibited increased extrinsic motivation in a hypermedia environs (Ford & Chen, 2000). Many studies reported significant effects on achievement (Brinkerhoff et al., 2001; Burke et al., 1998; Farrell & Moore, 2000-2001; Jones & Liu, 2001; Savenye et al., 1996; Zumbach & Reimann, 2001). Some investigations indicated that general positive behaviors occurred such as greater interaction with the program (Brinkerhoff et al.,
2001; Burke et al., 1998; Ford & Chen, 2000). Various research contexts did not report positive gains, yet the lack of significant differences implied no harm to learning (Ford & Chen, 2000; Jones & Liu, 2001; Tait, 1998).

Enthusiasm toward hypermedia was also evident. Without exception, studies reported positive attitudes toward learning in web-based hypermedia (Brinkerhoff & Glazewski, 2000; Brinkerhoff et al., 2001; Burke et al., 1998; Farrell & Moore, 2000-2001; Gimenez & Saenz de Jubera, 2001; Mack, 1995; Pedersen & Liu, 2002; Savenye et al., 1996; Tait, 1998; Yang, 2000; Zhu, 1999). Many times attitude and achievement were associated with levels of computer experience. As a rule of thumb, students with more experience reported greater satisfaction and seemed to achieve more (Brinkerhoff et al., 2001; Ford & Chen, 2000; Savenye et al., 1996).

Hypermedia Research: Implications for the Present Study

In the present study, nine high-achieving 10th grade, Advanced Placement students analyzed 10 historical documents in a hypermedia setting. Based on previous research, one expected that the treatment conditions provided favorable learning environments, particularly allowing greater freedom to navigate in nonlinear pathways, increased motivation, enhanced control, positive attitudes, and more interaction. Therefore, the crux of this study rested on the following supposition: The positive outcomes associated with learning in a web-based hypermedia environment would also manifest themselves in expert historian behaviors. Furthermore, integrating
hypermedia technology into a history lesson can enhance learning while adhering to acceptable standards and guidelines.

Learning and Teaching Standards

The National Council for the Social Studies (NCSS) advocates learning and teaching standards in history. Strand two of ten refers to the learning of history, “Time, Continuity, and Change,” meaning:

This theme typically appears in courses that: 1) include perspectives from various aspects of history; 2) draw upon historical knowledge during the examination of social issues; and 3) develop the habits of mind that historians and scholars in the humanities and social sciences employ to study the past and its relationship to the present in the United States and other societies (National Council for the Social Studies, 1994a, ¶2).

The present study satisfies all three conditions of the history strand. The 10 digitalized historical documents present multiple perspectives. The content focus of the study is a relevant social issue related to the status of women in the early U.S. republic. And the purpose of the study is to measure expert historian behaviors.

Teaching standards are meant to help facilitate the learning of history. One key tenet states:

Provide learners with opportunities to investigate, interpret, and analyze multiple historical and contemporary viewpoints within and across cultures related to important events, recurring dilemmas, and
persistent issues, while employing empathy, skepticism, and critical judgment; enable learners to apply ideas, theories, and modes of historical inquiry to analyze historical and contemporary developments, and to inform and evaluate actions concerning public policy issues (National Council for the Social Studies, 1994b, ¶2).

The tenet states that history teachers provide multiple perspectives in order to invite student empathy and critical analysis. Moreover, opportunities exist in the present study to engage in a pure form of historical inquiry, much like expert historians engage in when they analyze evidence. NCSS unambiguously supports a multiple views approach, much to the chagrin of its detractors. In addition, technology may aid in the learning and teaching of multiple perspectives.

The International Society for Technology in Education (ISTE) is a nonprofit educational technology advocacy group whose standards have either been fully or partially incorporated into 48 states’ curricula. In its “Foundation Standards for Students,” the organization provides six general standards for the adoption and use of technology in K-12 education. The last two, five and six, are particularly relevant to the present study:

5. Technology research tools

- Students use technology to locate, evaluate, and collect information from a variety of sources.
- Students use technology tools to process data and report results.
• Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

6. Technology problem-solving and decision-making tools

• Students use technology resources for solving problems and making informed decisions.

• Students employ technology in the development of strategies for solving problems in the real world (International Society for Technology in Education, 2000, ¶2).

Although students were prevented from roaming the Internet in the present study, conceptually the Internet group members used hypermedia to evaluate historical documents. Perhaps more importantly, technology became part of the problem-solving process as those study participants built knowledge structures related to women in the early U.S. republic.

Overall, the content and design of the study reflect good practice, aligning closely with accepted standards for effective social studies practice and technology integration. In the proceeding chapter, methods and procedures are discussed to provide answers to the research questions:

1. What expert heuristics are evident when high school students engage in a task requiring the examination of digital historical sources?

2. What expert historian heuristics do students use when navigating a simulated Internet to perform a prescribed task in history?
Chapter 3

Method and Procedure

The study was conducted at an urban high school in the southeastern United States with nine participants selected from an AP world history classroom. All the participants completed a general survey, a 10 item multiple-choice test on American history, and a computer use survey. Next, they were randomly assigned to one of three groups: (a) paper historical documents, (b) HTML historical documents, or (c) HTML historical documents with a simulated Internet access. While examining the historical documents, the participants were urged to reason aloud following the think-aloud protocol. The sessions were video recorded, and later, coded for expert historian heuristics. Descriptive statistics were used to examine the data. The study employed a qualitative design.

Participant Selection

The sample population for this study was a 10th grade, Advanced Placement, world history class at an urban high school in the southeastern United States. Although this population inherently limited the ability to generalize the results, it offered a control for extraneous variables such as reading comprehension, the ability to articulate thoughts, and hypermedia proficiency. Additionally, the Advanced Placement sequence suggests that the students will take American History while in the 11th grade. The
researcher arrived at \( n = 9 \) because it is easily divisible by the three groups, and in relation to the 10 historical documents, seeks depth in a larger range of experiences (Gall et al., 1996). The selection process began with an introduction by the researcher and followed with a general participant survey, a 10 item multiple-choice test (see Appendix C), and a computer use survey (see Appendix H).

The student survey was meant to provide the researcher with general background information to bolster the descriptive statistics. The multiple-choice section contained difficult questions about American history in general. Potential candidates should not have well-formed ideas about American history beforehand because they may bring an ingrained bias to the experiment. Next, potential participants filled out a computer use survey, and subsequently, standardized test scores were examined.

The computer use survey, (see Appendix H), offered a simple way to determine whether the student is familiar with using hypermedia. The survey was adapted from the Montgomery County Public Schools (1998) in Maryland and was archived with the U.S. Department of Education. In addition to computer use, the researcher controlled the reading ability variable.

In order to control for reading ability, the target population was an Advanced Placement 10th grade world history class. Two criteria determined eligibility for entrance to the class: above average grades and minimum rank score at the 50th percentile in the norm-referenced reading test (NRT) of the
Florida Comprehensive Assessment Test (FCAT). The target population was in the top 50% of nationwide readers. The data were collected as part of the 2002 FCAT when the participants were in the ninth grade. In 2002, the median Florida score was a 44 (Florida Department of Education, 2002). The participants scored well above the Florida median score.

After reviewing the survey and tests, the researcher randomly selected 15 potential candidates. The candidates were given a parental information letter together with parent and student permission slips. The AP world history instructor consented to offering all who participated extra credit points in their course grades. From the potential 15 candidates, 9 candidates were randomly chosen with the remaining 6 as alternates. Each participant was randomly assigned to one of three groups: paper historical documents (control), HTML historical documents (treatment A), and HTML historical documents with a simulated Internet access (treatment B). The nine participants met with the researcher individually over the course of nine school days during the third period of a four-period block schedule.

*Research Protocol*

The nine study participants met with the investigator individually in a quiet room equipped with a medium-sized table for the control group and a computer for the treatment groups. The researcher began with an introduction to the task and a practice of the research protocol (see Appendices F and G).
Simply stated, the think-aloud protocol is a method of data collection where the researcher observes and interviews participants while they perform a task (Jonassen, Tessmer, & Hannum, 1999). The steps to satisfactory execution are outlined. The protocol has both advantages and disadvantages. These are addressed in the following section together with suggestions for mitigating disadvantageous effects.

*Think-aloud.*

The think-aloud protocol gains legitimacy through its immediate transmission of thoughts. The participant continuously articulates thoughts while performing a prescribed task. The idea behind the protocol assumes that the participant is so engaged in the task, that she is unable to deviate from thought. In this section, the practical procedures necessary for successful implementation are discussed together with the pros and cons of the protocol. Lastly, ways to mitigate the effects of the cons are presented in Table 2.

Jonassen et al. (1999) outline 10 steps for successful implementation of the think-aloud protocol:

1. *Prepare for the interview; become task-literate.* The researcher in this study is an Advanced Placement American history instructor and is highly knowledgeable about social history following the American Revolutionary War. As the sole creator of the research design, he is also intimately familiar with the requirements and mechanics of the task.
2. **Choose the interviewee(s) for the think-aloud process.** The research participants are high achieving secondary students who are novices in the American history discipline. The target population helps to control extraneous variables related to reading comprehension and expression, although the ability to generalize is limited.

3. **Select the think-aloud tasks.** The think-aloud task is general enough to promote maximum discourse. Because the outcomes of history are readily apparent, the indeterminacy of the process is the key to developing historical understanding.

4. **Introduce yourself and explain the purpose of the interview.** As a teacher at the school of the sample population, the researcher established trust by being a familiar name and face. However, the researcher and the individual participants did not have personal relationships before the study, thus controlling extraneous variables. All research participants were briefed about the purpose of the study, confidentiality, selection reasons, and the uses of the results and conclusions.

5. **Do a trial run.** Using the Declaration of Independence, the researcher modeled the think-aloud process for each trial, and then the participant practiced. The practice continued until the participant felt comfortable with the procedure.

6. **Record the session.** All sessions were videotaped to capture comments and facial expressions. Furthermore, the researcher noted instances of major significance.
7. When necessary, prompt the task performer to speak out. When the participant paused in articulating thoughts, the researcher prompted her/him with questions like, “What are you thinking?” and “What does that mean?” Overall, the researcher attempted to minimally interject in the process.

8. Review the session with the performer. In instances when a participant’s responses needed further clarification, the researcher reserved the right to ask after the session what she/he meant. This applied to facial expressions as well.

9. Make a transcript. The videotapes were transcribed, analyzed, and coded.

10. Review the transcript with the performer. If further clarification was necessary after reviewing the videotape, the researcher and participant sat down to discuss the matter and view the tape together.

All 10 steps address what to do before, during, and after the protocol. The first three were accomplished before the treatment. The next five occurred during the treatment. And finally, the last two were conducted post treatment.

The TA protocol presents several potential disadvantages. Although no significant deviations in cognitive processes occur, researchers report that the process requires additional time for task completion (Ericsson & Charness, 1994). As seen in Table 3, the possible disadvantages can be mitigated by appropriate measures.
Table 2

Possible Disadvantages of Think-aloud Protocol with Mitigating Factors (Jonassen et al., 1999)

<table>
<thead>
<tr>
<th>Disadvantages</th>
<th>Mitigating Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking aloud is uncomfortable and awkward.</td>
<td>Select talkative participants.</td>
</tr>
<tr>
<td>Have participants practice the procedure.</td>
<td></td>
</tr>
<tr>
<td>Talking may interfere with cognitive processes.</td>
<td>Have participants practice the procedure to</td>
</tr>
<tr>
<td>make tasks more automatic, thus freeing up working memory.</td>
<td></td>
</tr>
<tr>
<td>Think-aloud protocol may not capture other automatic cognitive processes such</td>
<td>Researcher triangulates the data.</td>
</tr>
<tr>
<td>as image forming.</td>
<td></td>
</tr>
<tr>
<td>Participants may try to explain their behavior rather than their thoughts.</td>
<td>Researcher triangulates the data.</td>
</tr>
<tr>
<td>Transcribing and analyzing the data is time-consuming.</td>
<td>None is mentioned.</td>
</tr>
</tbody>
</table>

Coding process.

The videotapes were labeled and played back later for transcription. The transcribed data were parsed into substantive statements and a second column ran along the edge of the statements (Gillham, 2000). Three raters coded the statements in the second column as follows: For evidence of sourcing the document, an $S$ was placed in the column. For the contextualization heuristic, $CZ$ was used. In the case of the corroboration heuristic, the code
was CO. And lastly, data that were unclassifiable were marked with an X. A hypothetical sample of the coding protocol can be seen in Table 3.

<table>
<thead>
<tr>
<th>Reading of the text</th>
<th>Coding Heuristic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1790 Election Law</strong></td>
<td>S</td>
</tr>
<tr>
<td>This law was passed in the New</td>
<td></td>
</tr>
<tr>
<td>Jersey legislature in the early 18th century when they</td>
<td></td>
</tr>
<tr>
<td>really didn’t care much about women’s rights.</td>
<td></td>
</tr>
<tr>
<td>And be it further Enacted, That all free Inhabitants</td>
<td></td>
</tr>
<tr>
<td>of this State of full Age,</td>
<td></td>
</tr>
<tr>
<td>I’m not sure if women were considered free inhabitants, but I</td>
<td>CZ</td>
</tr>
<tr>
<td>think so in the 1700s in New Jersey.</td>
<td></td>
</tr>
<tr>
<td>In an earlier document it talked about women being like slaves,</td>
<td>CO</td>
</tr>
<tr>
<td>so I’m not sure about this.</td>
<td></td>
</tr>
<tr>
<td>Men can pretty much vote everywhere.</td>
<td>X</td>
</tr>
</tbody>
</table>

*Note. This is for illustrative purposes only. None of the study participants exhibited the sourcing heuristic.*

**Primary and Secondary Documents Related to Women in the Early Republic**

By definition, a pluralistic society accommodates a variety of perspectives. The late 18th and early 19th centuries were no exceptions to this condition. The woman’s role in public affairs was nearly nonexistent, yet occasionally, lone voices and public measures challenged male hegemony. Beginning with the ideals expressed in the Declaration of Independence, i.e., “that all men are created equal,” and following the ideal through, “deriving their powers from the consent of the governed,” the researcher assembled nine primary and one secondary source documents. The documents were selected based on the following criteria: (a) They had to showcase or infer the
status of women from the early republic; (b) They had to showcase or infer multiple perspectives; (c) They had to convey meaning within spatial and time constraints; and (d) They had to represent a variety of sources. The process of learning history is an exercise in reasoning indeterminacy. The collection of documents provided the evidence to arrive at some sort of understanding—a solution to a problem.

The study was predicated on 10 historical documents attributed to the following authors and artists in chronological order: John Adams, Abigail Adams, Alexander Hamilton, Amos Doolittle (most likely), Catharine Macaulay, the New Jersey legislature, unknown, unknown, the New Jersey legislature, and Charles Beard. Of the nine primary source documents, three are excerpts from letters, two are state laws, one is an engraving, one is a newspaper advertisement, one is a diary entry, and one is song lyrics. The one and only secondary source is an excerpt from a book published in the early 20th century. Solo men produced four documents, solo women wrote two, a body of men legislated two documents, and unknown individuals or groups produced two documents.

Summary of the Documents

The documents were arranged in chronological order. The earliest was written in 1776 and the latest in 1935. Most were produced within 10 years of the Philadelphia Constitutional Convention, with the exception of the last two documents (see Appendix A).
Document #1: Letter from John Adams to James Sullivan. Written shortly before the American Revolution, the letter pondered majority rule and the role of women in society. It concluded that women were too delicate for politics and were, by nature, best suited as domestic caregivers.

Document #2: Letter from Abigail Adams to John Adams. Throughout the course of their prolific correspondence, Abigail and John exchanged ideas freely. In this August 1776 excerpt, Abigail lamented the disinterest of women in politics because men legally controlled them. She concluded that historically women have been as heroic as men.

Document #3: Alexander Hamilton’s notes at the Philadelphia convention. While the convention debated suffrage and representation, Hamilton offered a suggestion on representation based on “free inhabitants.”

Document #4: Engraving from 1787 probably by Amos Doolittle. This engraving captured the major issues dividing the Federalists from the Antifederalists. Woman issues appeared nonexistent.

Document #5: Catharine Macaulay’s letter on education. In this letter, Macaulay stated that men were physically stronger than women and that they used this strength to oppress women.

Document #6: 1790 New Jersey Election Law. The law explicitly referred to women of property being able to vote.
Document #7: First stanza lyrics to the song, Rights of Woman by an unknown artist. Published in the Philadelphia Minerva on Saturday, October 17, 1795, the words urged women to fight for rights.

Document #8: Newspaper advertisement of slave girl for sale. In this 1797 advertisement, a slave girl was offered for sale as property.

Document #9: 1807 New Jersey Election Law. The law clearly stated that free, white men of property were the only eligible voters, directly repealing woman suffrage.

Document #10: Excerpt from Charles Beard’s treatise. Beard enumerated the social groups that had an economic status under the Constitution, but lacked any legal rights related to voting and representation.

Research Instrument

The research instrument consisted of a collection of three tools. Using HTML, the researcher designed and authored web pages infusing the 10 historical documents (see Appendix I). The three distinct tools were used for Treatments A and B, and are referred to as Tool 1, Tool 2, and Tool 3. The tools contained many similarities, especially Tools 2 and 3, which only differed with respect to an added button with a resulting action. A description of the tools follows together with a design rationale.

The first web page for each tool was identical. It stated the context and the task. When the participant finished reading the page, she clicked on “NEXT,” which took her to the main page. The main page was also identical
in all three tools and contained a reiteration of the task along the top frame of
the screen, a list of the documents in a frame along the left side, and a larger
frame containing a script along the right, which also served as the window
for the document display.

The top, horizontal frame was sized to precisely fit the task. The
document frame was also sized to fit the documents precisely, which were
referred to by cardinal numbers so as not to bias the sourcing heuristic. In a
typical computer configuration, all documents were readily accessible
without the need for scrolling. Furthermore, the goal was to leave the
maximum amount of space for the window frame reserved for the document
contents.

The researcher produced the web pages using acceptable design principles
including balance, symmetry, margins, font size, and color (Lynch & Horton,
2002). Keeping with the patriotic theme of the task, red, white, and blue
figure prominently in the design. Moreover, these colors offered striking
contrast for white and black texts. The design was continuous across the
tools.

Tool 1 differed from the other tools in that it contained a full version of
the documents. When a participant clicked on a document, the document
appeared in the window in its entirety. Participants randomly assigned to the
HTML and Internet groups performed a first pass of the documents using
Tool 1. The purpose of the first pass was to lessen the disadvantages of the
think-aloud protocol by promoting familiarity. After the first pass, the
HTML members performed the task using Tool 2 and the Internet participants did the same using Tool 3.

Tool 2 deconstructed each document into reasonable fragments and simple sentences, which facilitated the think-aloud protocol. Two large “Back” and “Next” buttons allowed the participants to linearly navigate each document. At the end of the document, the participant was able to “Start Again” or to choose a new document. At any time, a participant was allowed to switch to another document, however it would always restart at the beginning. The exception, of course, was the one pictorial document.

Tool 3 applied to the Internet group and appeared exactly the same as Tool 2 with one difference: Under the source information, a large, horizontal button offered a link to additional information. When a participant “Click[ed] Here to Find Out More,” a new window popped up with a simulated Internet presence. The participant had to close the window before proceeding with the task. Experts validated the three tools.

*Expert validation.*

Graduate students in an instructional technology class were asked to evaluate the usability of the instrument. Usability refers to the relative ease of navigating a website. Using a 10-item evaluation sheet (see Appendix B), the experts scored each item on a scale from 1 (strongly disagree) to 5 (strongly agree), with 3 being neutral. The items were written so that a higher score indicated more usability. The evaluators were asked to justify their scores with comments. Additionally, a general item was included at the
end requiring an overall rating. This overall rating ranged from 1 (no usability) to 7 (highest usability) with 4 being the neutral value (Bunz, 2001). The evaluators completed an evaluation survey for each of the tools.

There were 17 evaluators for a total of 51 evaluations. The evaluators indicated the type of computer platform they were using (Windows® or Macintosh®) and the Internet browser (Netscape Navigator® or Internet Explorer®). Moreover, they were asked to place their initials (or some other distinguishing mark) atop all three pages for administrative purposes.

The researcher calculated the mean averages of general usability for all three tools, and then turned to the individual items for possible design weaknesses. Although the average scores varied (Tool 1 = 5.1, Tool 2 = 4.58, and Tool 3 = 5.58), all were well within the neutral to high usability ranges. Because the largest disparity was between Tools 2 and 3, and these tools were most similar in that they only differed by the addition of one button in Tool 3, the researcher examined the individual items for an explanation.

Overall, the individual items scored high with the exception of number 7. Number 7 referred to the selection options such as buttons. Many of the evaluators decided that the “Back” and “Next” buttons were too large and distracted from the content. One typical comment was, “The button size took over the text size.” Although the large buttons were meant to smoothly facilitate the think-aloud protocol, they seemed to offend the aesthetics of the experts and change the focal point of the website. Evidence of this was the
addition of the “Click Here to Find Out More” button in Tool 3. Several evaluators felt that this offered balance to the “Back” and “Next” buttons. In order to address these grievances, the researcher increased the size of the document text and slightly shrunk the size of the buttons. In general, and especially with the minor changes, the instrument gained sufficient validation from the experts. Additionally, the acceptable ratings appeared consistent across the computer platforms and Internet browsers.

Statistical Analyses

The research design is qualitative. After conducting the experiment, the investigator transcribed the qualitative data. Three raters coded the transcripts for expert historian heuristics as defined by their respective operational constructs (see Table 1). The Interrater reliability percentage was calculated. The raters compared and reconciled differences in specific instances of coding. After the interviews were transcribed and coded, the researcher analyzed the data with descriptive statistics. Descriptive statistics such as group means and ranges for expert historian heuristics were calculated together with Internet group mean for Internet access.
Chapter 4

Results

Nine 10th grade Advanced Placement world history students examined documents related to the status of women in the early U.S. republic in a qualitative design with three conditions. The first group, the control, studied paper documents. The second group, treatment A, scrutinized HTML-enhanced digitalized documents. The last group, treatment B, evaluated the digitalized documents and had voluntary access to a simulated Internet. The researcher videotaped the sessions and three raters coded the remarks for expert historian heuristics, specifically for sourcing, contextualization, and corroboration. The investigation revealed insights into how students use primary and secondary sources to perform a task and the influence of computer technologies on that process.

Coding Expert Historian Heuristics

At the end of the sessions, the researcher transcribed the videotapes. Next, the transcriptions were separated into discrete statements and numbered. The researcher, together with two volunteer raters, discussed the heuristics and independently evaluated the numbered statements for each of the study participants. The raters were not associated with education nor
were they historians, implying that they approached the task with fewer biases to the process.

*Transcription.*

In most instances, the statements easily and naturally broke into discrete units because the bulk of the statements were unitary reactions to a just-read phrase. The following example from HM illustrates this process:

HM: *But let us first suppose that the whole community of every age, rank, sex, and condition, has a right to vote.*

HM: I’m thinking that they’re trying to make a Utopia with age, rank, sex, and condition.

HM: *This community, is assembled, a motion is made and carried by a majority of one voice.*

HM: It’s not just one person voting for everything, it’s a group.

Most statements flowed in this manner, allowing for obvious and discrete separations. At times though, some of the participants reacted in a much more sophisticated manner. DA’s reaction with a different phrase in the same document supported this contention:

DA: *But why exclude women?*

DA: I guess back then, when I read in the other binder that women were by nature not made for this kind of thing for political purposes I guess. They were supposed to stay home and take care of the children. From John Adams to James Sullivan.
Clearly, DA expressed two ideas in her reaction. First, she reacted to the document with a statement about the role of women. In the last fragment, she commented on the attribution. In the final transcript, DA’s reaction appeared as two numbered statements. As the above example illustrates, occasionally the heuristics themselves dictated how the investigator parsed the statements. The investigator produced a transcript where each of the parsed statements was numbered in sequential order and a space was provided for the coding process.

It should also be noted that nonverbal actions sometimes signaled thought changes. Occasionally the students exhibited instances of confusion, switched over to other documents, or made gestures to prove a point. These instances were transcribed in parentheses. In the coding process, some of these actions served as evidence for the corroboration heuristic.

*Elaborating the coding process.*

The main purpose of the study was to measure expert historian heuristics as the participants engaged in the reading of historical documents in three distinct conditions. The two outside raters met with the researcher to discuss possible manifestations of the three heuristics (see Table 1). Following the discussion, the researcher modeled the process of rating the transcript by engaging in a simulation. The investigator suggested that the raters place either a CO, CZ, or X next to each of the numbered statements indicating evidence of corroboration, contextualization, or neither. Then the raters,
including the researcher, independently evaluated the transcripts and agreed to meet at a later time for analysis and reconciliation.

The first heuristic, sourcing, was succinctly defined as the formulating of a hypothesis based on the attribution before the reading of the document. The transcripts readily revealed that every student failed to source the documents before reading in all cases. The remaining two heuristics, contextualization and corroboration, required coder evaluation. The researcher provided verbal clues for the evaluators to follow (see Table 1).

The evaluators met the following week to discuss the results. A master copy indicated areas of agreement and disagreement. From the initial results, the inter-rater reliability was calculated at about 86%. The raters initially agreed upon 427 of the 497 statements, resulting in the disagreement of 70. Of the 70 statements of disagreement, the two outside raters disagreed concomitantly with the investigator 8 times. The remaining 62 areas of disagreement involved one of the outside raters disagreeing with the investigator and the other outside rater. Of these remaining 62 areas, one outside rater disagreed in 48 of the instances. This can be attributed to some rater confusion of what constituted the contextualization heuristic. She liberally ascribed the heuristic to statements that were not within the guidelines. The three raters sat down to mediate the differences and concurred on areas of disagreement. The final copy reflected these mediations. The investigator reported descriptive statistics followed by the results of the analysis.
Descriptive Statistics

The quantities of discrete statements together with the results of the coding process are presented with reference to the overall study design. Moreover, the researcher reports heuristic means, ranges, and the Internet group mean for Internet access.

Collectively, the nine study participants generated 497 discrete statements. The group breakdown showed that the control group created 165 statements, the HTML only group produced 148, and the Internet group made 184. While participants in the Internet group, on average, generated the most verbal reactions to the documents, most of these additional statements can be attributed to only one of the students. From these breakdowns, the coded statements were summed for the contextualization and corroboration heuristics.
Of the 165 statements generated by the members of the control group, 28 were coded for contextualization while 21 for corroboration. In the case of the HTML group, the coders found 9 instances of contextualization and 11 of corroboration. The Internet group exhibited 35 instances of contextualization and 20 of corroboration. Complete results are shown in Table 3. The group means for each of the heuristics are indicated in Figures 1 and 2.
The group means are based on a range of values for each group on a specific heuristic. In the control group, the ranges are 16 and 0 for contextualization and corroboration respectively. The HTML group shows ranges of 2 for contextualization and 9 for corroboration. At the same time, the Internet group has ranges of 20 and 7 in the same order. The larger values indicate substantial individual differences within the small sample size. Indeed, in the control group, DA generated a high of 19 instances of contextualization while HW, 3. In the Internet group, CL2 produced 27 contextualization references and CS created only 1.
Table 4

*Study Participant Statements and Expert Historian Heuristics*

<table>
<thead>
<tr>
<th>Group</th>
<th>Participant</th>
<th>Total Number</th>
<th>Sourcing</th>
<th>Contextualization</th>
<th>Corroboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>WC</td>
<td>51</td>
<td>0</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>HM</td>
<td>52</td>
<td>0</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>DA</td>
<td>62</td>
<td>0</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Totals</td>
<td>165</td>
<td>0</td>
<td>28</td>
<td>21</td>
</tr>
<tr>
<td>HTML</td>
<td>SS</td>
<td>55</td>
<td>0</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>BM</td>
<td>46</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CL1</td>
<td>47</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Totals</td>
<td>148</td>
<td>0</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Internet</td>
<td>KT</td>
<td>54</td>
<td>0</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CL2</td>
<td>83</td>
<td>0</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>CS</td>
<td>47</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Totals</td>
<td>184</td>
<td>0</td>
<td>35</td>
<td>20</td>
</tr>
</tbody>
</table>

The participants in the Internet group clicked on the “Find Out More” button on average three and one-third times. While KT accessed the simulated Internet six times, CL2 and CS accessed it only two times each. Moreover, CL2 and CS only clicked on the “Find Out More” button in the beginning of the session within the first few documents that they analyzed.
KT tended to investigate the Internet intermittently during the course of examining all the documents.

*Findings*

The nine case studies helped to shed light on the learning of history using primary and secondary source documents while performing a prescribed task, namely describing the status of women in the early U.S. republic. The results of the computer technologies are presented as well.

*Learning history using primary and secondary sources.*

Of the 10 historical documents integrated into the study design, 9 were primary sources and 1 was a secondary source. Most of the students’ reactions to the documents followed a simplistic pattern of reading and interpretation devoid of a subtext. The students, in many instances, failed to perceive critical nuances within the documents, and hence, exhibited frequent bouts of confusion and frustration. Furthermore, the students often engaged in presentism, judging the past through the values and ideals of the present. At the same time, they often articulated U.S. history as a steady march through time with ever-expanding civil rights. Likewise, the culminating activity, the summarization of the findings, helped highlight links between heuristics and subtexts.

*The reading and interpreting of the documents.*

After learning the procedure, practicing the think-aloud protocol, and perusing the 10 documents, the student subjects performed the task of incrementally reading and reacting to the documents in any order they
desired. The students followed two basic patterns: The predominant pattern was to read a line and react to it in a superficial manner, while the other pattern reflected a deeper subtext, i.e., an awareness of hidden and latent meanings within the documents (Wineburg, 2001).

Of the nine participants, seven followed the pattern of superficial reaction. WC illustrated this point while examining Document 1:

WC: But let us first suppose, that the whole community of every age, rank, sex, and condition, has a right to vote.

WC: That everyone no matter who they are can vote.

WC: This community, is assembled a motion is made and carried by a majority of one voice.

WC: It’s democracy; one voice has the power to vote.

WC: The minority will not agree to this.

WC: The people who do not vote have no say in anything.

WC: Whence arises the rights of the majority to govern, and the obligation of the minority to obey?

WC: The minority has to listen to the majority; they’re higher up in status.

WC: From necessity, you will say, because there can be no other rule.

WC: You have no say with what the government comes up with.

WC: But why exclude women?

WC: Why can’t women be part of the voting system? Why are they so special that they’re not allowed to vote?
The simplistic reactions are characterized by short bursts of words and the absence of a unifying theme (Wineburg, 1991b; Yeager & Davis, 1995b).

Two of the nine participants engaged in a deeper analysis, invoking a subtext throughout the process. DA’s analysis of Document 1 exhibited this phenomenon:

DA: *But let us first suppose, that the whole community of every age, rank, sex, and condition, has a right to vote.*

DA: That’s including everyone, including women. This was an excerpt of a letter from John Adams to James Sullivan written on May 26th 1776. John Adams was the president, if I’m not mistaken. I think he was the second president.

DA: *This community, is assembled a motion is made and carried by a majority of one voice.*

DA: OK, so the majority decides the motion, this also is the letter from John Adams to James Sullivan.

DA: *The minority will not agree to this.*

DA: Of course, that’s the opposite of the majority, and the minorities don’t, they’re the people that actually disagree, from John Adams to James Sullivan.

DA: *Whence arises the rights of the majority to govern, and the obligation of the minority to obey?*
DA: So, if the majority is the dominant one, they have no choice because they are the smaller portion; from John Adams to James Sullivan, again. I actually disagree with this.

In this excerpt of DA’s remarks, the reactions to the document were fairly lengthy and contained a subtext where she constantly referred back to the letter author and intended receiver. She and CL2 developed clear patterns of subtext throughout their analyses while the other seven participants rarely, if ever, exhibited this pattern. The absence of a subtext may have contributed to the participants’ failure to perceive key pieces of evidence and may have resulted in frequent episodes of confusion.

*Issues of confusion.*

All the students became confused at one time or another while navigating through the documents. BM often reread the excerpts of the documents many times before settling with a, “I don’t know.” More times, the participants displayed a bewildered expression and shrugged shoulders with no interjection. The investigator transcribed these moments in parentheses. In some cases, the researcher reassured the students that it was acceptable to continue when the frustration level seemed to paralyze their thoughts. SS, while examining Document 3, demonstrated this frustration level:

SS: *The convention having before it a proposition by Edmund Randolph that the rights of suffrage in the national legislature ought to be proportioned to the quotas of contribution,*

SS: (He rereads the excerpt.)
SS: (sustained silence)

Investigator: Tell me what you’re thinking.

SS: I don’t know.

Investigator: That’s OK. You are allowed to continue.

CS’s response to Document 2 exemplified another source of frustration, atypical words and complicated syntax:

CS: *Even in the freest countries our property is subject to the control and disposal of our partners, to whom the laws have given a sovereign authority.*

CS: Words are spelled strangely and I’m not sure the words mean what I think they mean. The property of the people, if a woman is married to a man, the property should not be given to the man. And let’s say that the woman dies, the men should get the woman’s property, but not if they are living together. It should still be called the woman’s property.

While she formulated a viable interpretation, oftentimes she simply remarked on the words rather than offering an interpretation as in the next line of the document:

CS: *Deprived of a voice in legislation, obliged to submit to those laws which are imposed upon us, is it not sufficient to make us indifferent to the public welfare?*

CS: That a kind of weird quotes type. Again, words are spelled strange.
In addition to frequent incidences of confusion, the participants often missed the nuances of the documents.

**Misperceptions and misconceptions.**

Perhaps the greatest contradiction between the documents occurred between Documents 6 and 9, the New Jersey Assembly election laws. In Document 6, it inferred that women have the right to vote by incorporating the words, “he or she.” In Document 9, which described the election law promulgated 17 years after the first, it clearly stated that only “free, white males” are allowed to vote. Three of the nine study participants, WC, BM, and CL2, detected that the first law included women, yet all of them refrained from incorporating the evidence into their narratives later. Their reactions were as follows:

**WC:** Sounds like the women can vote in this one, it don’t matter if you’re a boy or a girl.

**BM:** Here it’s trying to say he or she; that women have the right to vote. I don’t believe that’s right because they weren’t allowed to vote. It’s talking about how you can’t vote anywhere else, except where you live.

**CL2:** More or less if you qualify correctly, and you have good money to your name and have lived in the place long enough, that you can vote for the member of your township or your township alone. And I assume this would include women. As part of the New Jersey 15th
assembly, the passed 1790 election law; more voters and not just the
more fortunate white men.

None of these students ever mentioned this aberration again, most telling
when they summarized their findings. BM went so far as to question the
validity of the law. Another universal misinterpretation involved the one
image, the engraving in Document 4.

Document 4 was the only pictorial document and was also the most
complicated in terms of multiple themes. The reactions to the document
were varied. Most were simplistic:

CL2: It’s a picture. I guess it’s a looking glass.

CL1: I think this shows how some people agree with what’s going on,
how some are leaders. Some, even though they’re leaders, they’re
still getting stuck, shows how everybody had a different job to do, it
all looks pretty destructive in the jobs that they did.

SS: There’s a guy in a cart who looks like he’s being pulled by other
people because he’s important. And there’s other people working
around.

WC: All the free people should have a spot in the legislature.

HM: Shows difference of class—a richer side is on the left side.

Shows how history was in America at that time.

Others interpretations tended to border on sophistication, as with BM and
DA. BM decided to return to the document toward the end of the session:
BM: I notice how the people are going different directions. It’s trying to show separation, disagreements. Some people are going one way and other people are going the other way. It looks like it’s showing the different classes of the people too. These are representatives of the poor people, or the working people (points with cursor). These people don’t look exactly like wealthy, but they look more intelligent, like they know what they’re doing (points with cursor). They’re better dressed than the other people. This person looks like he’s tied to a chair. I just think it’s trying to represent the different classes I think. It’s not very clear to me. I think I’m done.

DA: OK, a house divided against itself, I guess trying to hint internal conflict. If I’m not mistaken, there is a picture here, looks like not actually a war, but there is some boats down here, looks something like from the colonial period. The looking glass, three men pulling this wagon. I don’t know, I think they should have like painted something else, but I really like the title, a house divided against itself cannot stand. I can’t understand what the picture has to do with the title though.

All the study participants failed to see the subject matter as the Connecticut Compromise and, in relation to the task, women influences and issues were wholly absent. More interestingly, when KT and CS were confronted with a direct interpretation by clicking on the simulated Internet, KT still failed to connect women issues and CS became agitated:
KT: Showing…it says Connecticut there…showing that if they split into two different ways of thinking, then that wouldn’t be a good way to go.

(Clicks on Internet button)

OK, they are divided and it’s just going to cause more problems.

CS: In this picture, it looks like New York down on the bottom. Of God or something in the clouds, is firing and lightning down on it. The town of New York. Ships are sailing to the new American land. It looks like this guy is rolling money. He’s got a rake so he’s doing some sort of farming, on this little area of land. It looks like agriculture. Trying to get the city to live, it looks like a bird, a bird farmer something. This guy, they’re fighting over Connecticut or something.

(Clicks on Internet button)

It’s a very good way of interpreting the picture. I personally would have said something else, but I guess that is what is meant (clearly agitated).

Overall, the students experienced trouble discerning differences among the documents and interpreting the pictorial element. Even when confronted with a direct interpretation, two members of the Internet group failed to relate the subject matter to an absence of women’s political influence in the early U.S. republic. Another common pitfall in the interpretation of the documents was the frequent foray into presentism.
Presentism.

Students of history often interject the present into their study of the past. They may offer a personal opinion reflective of their modern values or they may make direct connections to the past from the present. DA offered an example illustrating the former while commenting on Document 8, the sale of a young, black slave. CL2 showed presentism while reacting to an excerpt from Document 1, the letter from John Adams to James Sullivan:

DA: *Near nine years time of a black girl, about 19 years of age;*

DA: I actually thought this was rather cruel—to actually have African American, little girls, advertised, near nine years—about 19 years of age.

CL2: *But why exclude women?*

CL 2: This is from the same letter. Well, I think that this is what the whole point of this exercise is, summed up in one sentence, why would you exclude women? It’s one of those questions that he wants you to think about, just what it says there, self-explanatory. It would make no sense because women are part of the country, if the country was a democracy, thus ruled by the majority. I would say women are definitely part of the majority. The world is not just made up of men and nothing else, white men over the age of 21 and nobody else.

DA lamented the cruel nature of slavery, although the advertisement was nearly cheery in expressing the wishes of the slave. CL applied a decidedly modern definition of democracy on the early U.S. republic. The transcripts
were rife with examples of presentism. Another common habit was to view history as a constant progression towards expanded civil rights.

*Student conceptions of expanding civil rights.*

Although the students were asked to summarize their findings on the status of females in the early republic, many took the opportunity to express their thoughts on civil rights to the present. In the process, they revealed their conceptualizations of history. CL2 best represented this phenomenon when he remarked,

The people who believe that certain people are free are comfortable with what they know. They just want to stay in their own little sheltered world, not even realizing not everyone has freedom. And the other group of people who believe that everyone is free; they also believe that not just women, African Americans, slaves, indentured servants, that they all have freedom. So, to say that the status of women in the early years of the United States Republic relative to the ideals of the declaration of independence, they didn’t have as many freedoms as they would’ve liked, yet, to the work of activists they gained more and more each day, and that the role that they played in society started to actually hold true to the declaration of independence.

CL2 expressed both presentism by framing the debate within the bipolar contours of fundamentalism and liberalism, (which he mentioned earlier in the discourse by name), but he also represented expanding rights as
advancing, “more and more each day.” This was a typical perspective expressed and inferred by many of the students, particularly when they summarized their findings at the end of the sessions. The summarizations also tended to contain the most references to expert heuristics.

*Connections between heuristics, subtext, and summarizations.*

With the exception of DA and CL2 who utilized expert historian heuristics within their narratives, (the only two participants who consistently recognized subtexts), most of the study participants sparingly exhibited heuristics until they reached the end of the session when they summarized their findings. A vast majority of the students looked back to the documents and peppered their narratives with references to contextualization. The exception to this was BM and CL1, who neither created subtexts nor looked back to the documents when they summarized their findings.

The summarizations varied in length and quantities of expert heuristics. BM and CL1 said the least and also had the least number of heuristics, a total of four each, none within the summarizations. A more typical pattern was WC who generated 9 of 10 examples of heuristics in his summarization:

(Look back) [corroboration]

I’m looking for where I saw where women were, women have no rights. Back then, [contextualization], they were just meant to stay at home and take care of the kids. Women’s work was child’s care, they didn’t think that they should be able to go out and vote, government, and America itself.
even the black people weren’t allowed to vote; they were slaves, even girls and men.

They thought that women were the minority and that they had no say in the government.

That it contradicts itself, because sometimes it says that women were equals, but then in other sections it says that women had no rights.

Some women controlled the slaves back then. (WC examines engraving.)

So they did have some rights, they just weren’t allowed to vote.

Some people thought that they should be in slavery.

States that woman is free. They should let the women…they should let the women say what they want to say, and it might help the government out.

So back then [contextualization] the women really weren’t allowed to do anything, take care of the kids, the household, they weren’t allowed to vote, go out by themselves, so I believe that the women had no rights.
In his summarization, WC reconciled the documents to produce a coherent, albeit somewhat inaccurate, narrative at the end. He attempted to provide a context within the time period with two instances of “back then.” Of the nine study participants, seven followed this pattern while DA and CL2 wove heuristics into their narratives throughout the entire session. The last component of the findings addresses the affects of computer technologies on the process of analyzing digital sources.

*Computer technologies and the learning of history.*

The control group received paper documents while the treatment groups accessed digitalized versions of the same documents. In some instances, HTML facilitated more latitude in movement within and between documents. Some students manipulated the mouse and pointer for emphasis. Others, used the mouse and pointer to scrutinize documents, much like a finger. The Internet group could click on an additional button to access a simulated Internet. Accessing the additional information via the simulated Internet aided in the clarification of ideas.

*Using computer technologies to navigate within and between the documents.*

In general, the HTML and Internet groups’ subjects were more likely to freely move both within and between documents. The documents were parsed into phrases to facilitate the think-aloud protocol. Frequently, students would lose their trains of thoughts because they became confused by the syntax and/or vocabulary. When this occurred, the subjects in the HTML
and Internet groups more often clicked on the “back” button to reread a previous phrase. This happened a total of 18 times between the six participants in the two groups. Only one instance of this was observed in the control group. The computer-based students were also more likely to navigate among the documents in a nonlinear fashion.

While most of the study participants followed the documents in numerical order, some chose to deviate. BM, CL1, KT, and CL2 chose to either skip certain documents and return later, or revisit a document for further analysis. The students appeared to maneuver freely within the program. Only HM in the control group analyzed the documents out of numerical order. At times, some of the computer group students manipulated the mouse and pointer to emphasize their narratives. Examples of this were BM and CL1 while studying the image. BM declared,

> It looks like it’s showing the different classes of the people too.
> These are representatives of the poor people, or the working people
> (manipulates pointer with mouse). These people don’t look exactly like wealthy, but they look more intelligent, like they know what they’re doing (manipulates pointer with mouse).

CL2 concentrated on the links frame during his summarization (The links frame only contained the documents by number). As he passed the cursor over the links, he mumbled some things and declared, “Documents 6 and 10 were laws that discriminated against women voters.” BM, CL1, KT, and
CL2 all used the mouse and cursor for various organizing strategies. The Internet group also used technology to clarify documents.

The Internet group members clicked on the “Find Out More” button a total of 10 times. Nearly every time this happened, the students offered evidence that their understanding of the document improved, although that did not necessarily mean that they exhibited expert historian heuristics. Earlier it was mentioned that CS became agitated when confronted with an accurate interpretation of the picture of the engraving. But other instances of clarification abounded.

While examining Document 1, CL2 clicked on the Internet, read a portion of the letter from John Adams to James Sullivan, then stated, “I think I have it now.” KT navigated the Internet to read Abigail Adam’s biography, then declared, “So this is probably saying that they [women] are smart enough they can handle that.” Later KT accessed a description of the slave girl advertisement and uttered, “So it’s the beginning of an advertisement to sell her.” In general, the students in the Internet group tended to benefit from their excursions to the simulated Internet.

Summary of the findings.

Seven students reacted superficially to the documents following a pattern of reading and reacting, while two interwove subtexts throughout. These two students also accounted for nearly half of the expert heuristics. Moreover, the students in general failed to perceive nuances between the documents. While examining the documents, they engaged in presentism and sometimes
viewed history as ever-expanding civil rights. The summarization task prodded many of the participants to look back and contextualize the documents. The computer-based subjects showed evidence of using the mouse and cursor for organizing strategies and emphases. Furthermore, when members of the Internet group chose to access the simulated Internet, they produced statements supporting increased clarification.
Discussion

In nine case studies, expert historian heuristics were measured in Advanced Placement world history students at an urban high school in the southeastern United States. The participants were randomly assigned to three groups: paper documents, HTML documents, and HTML documents with limited, simulated Internet access. Using a think-aloud protocol developed by Jonassen et al. (1999), the participants reasoned a task of indeterminacy; specifically, they were instructed to describe the status of women in the early U.S. republic relative to the ideals contained in the Declaration of Independence. The investigator videotaped, and then transcribed the data. The data were parsed into discrete entities, and later coded by three raters. The raters indicated instances of: sourcing before reading the documents, contextualizing the documents in geographic space and chronological time, and corroborating important details between and among documents. The purpose of the study was to answer the following research questions:

1. What expert heuristics are evident when high school students engage in a task requiring the examination of digital historical sources?
2. What expert historian heuristics do students use when navigating a simulated Internet to perform a prescribed task in history?
The findings support and enhance previous research related to how secondary students learn history while performing a task using primary and secondary source documents. Two of the students succeeded in identifying a sophisticated subtext, which may partially explain the total absence of the sourcing heuristic. The outcomes of the study are also compared to previous research in the field of students making sense of history. Specifically, the results are discussed within the context of historical significance, historical time, the development of multiple perspectives and sense of empathy, and historical inquiry. The research also highlights both the potential and limitations for integrating computer technologies into the process of learning history using digitalized documents.

Overall, when students accessed the Internet to find out more, they exhibited enhanced understandings. Additionally, the students in the HTML and Internet groups moved within and between the documents with greater frequency, concurring with earlier hypermedia research. Some of the students manipulated the mouse and cursor like a finger to emphasize narratives and, other times, to discern differences. Yet, two student participants stand out as exemplars of utilizing expert historian heuristics, one from the control group and the other from the Internet group. The implications of these results are discussed within the parameters of previous research. In the conclusion, the researcher offers a summary of the findings together with implications and future research directions. He suggests that
the marriage of computer technologies with the learning of history offers great promise.

Secondary Students Using Expert Historian Heuristics

The nine study subjects generated a total of 497 discrete statements while examining 10 historical documents related to women in the early U.S. republic. The task was to investigate, then articulate, the status of women in the context of the ideals of the Declaration of Independence. The subjects’ 497 statements together with various actions and reactions led to the observance of 124 instances of expert historian heuristics. Slightly more than half of these instances (n = 63) can be attributed to two of the study participants, DA from the control group and CL2 from the Internet group. The findings illuminated the process of 10th grade Advanced Placement world history students using primary and secondary sources to perform a task.

While the other seven participants followed a simplistic pattern of reading the documents and reacting with short expressions, DA and CL2 tended to constantly be aware of the task, and thus wove a narrative throughout. DA and CL2 seemed to be aware of a subtext, something Wineburg (1991b, p. 498) defines as, “a text of hidden and latent meanings.” He further differentiates subtext into two related concepts, rhetorical artifacts and human artifacts, meaning text as words and texts as products of human existence.
Rhetorical artifacts suggest the hidden and latent meanings associated with the author’s intentions and purposes are transmitted within the words of texts. This is the level of analysis that the novice student historians operated on while examining the 10 documents. During her analysis of Document 7, CL illustrated this level of analysis:

CL: *God save each female’s right,*

CL: Saying that God stopped them in what they’re doing or God help the women.

CL: *Show to her ravish’d fight*

CL: How women fought for what they wanted.

CL: *Woman is Free;*

CL: That now women are free because of this.

CL: *Let Freedom’s voice prevail,*

CL: Trying to say that they want women to voice what they have and hopefully the freedom will just get louder and louder until they won.

CL: *And draw aside the vail,*

CL: I would say the Vail is, when they don’t want them to do something, or they’re trying to fight against it. They’re trying to have more people on their side and not against them.

CL: *Supreme Endulgence hail,*

CL: Let everybody know what they’re doing and have everybody agree with what they’re doing and not just most people, and not just a little bit.
CL: *Sweet Liberty.*

CL: Saying that’s just what liberty is, not just what people think it is.

CL closely followed the simplistic read and react pattern mentioned earlier, but she also found meaning in the author’s words. In the beginning of the document, her words merely restated the text, but as she advanced further within the document, she seemed to shift to a deeper level of analysis. Now the word, “vail” came to symbolize a metaphor for some women offering protest to their condition, a rallying cry. CL interpreted the author’s goals and intentions expressed through the literal and figurative meaning of words. All nine, study participants functioned primarily at this level during the course of the study, although DA and CL2 sometimes looked beyond words, seeing the documents as human artifacts.

DA and CL2 carried on coherent, unifying conversations with themselves while analyzing the documents. The conversations were situated within the setting of the task and many times strayed from the literal and figurative meanings of the words. While examining Document 10, the only secondary source, CL2 transgressed the boundary of words and read meaning into the life of Charles Beard,

CL2: *In an examination of the structure of American society in 1787, we first encounter four groups whose economic status had a definite legal expression:*

CL2: So, the author, a passage from Charles Beard’s book, *An Economic Interpretation of the Constitution of the United States,* it
was published in 1935. So this guy, Charles Beard, he was allowed to
examine four groups that existed back then in American society.

CL2: *the slaves, the indented servants, the mass of men who could not
qualify for voting under the property tests imposed by the state
constitutions and laws,*

CL2: So, he’s describing the four groups of people who cannot vote;
which are the slaves, the indented servants who were partial servants,
but not due to slavery, the mass of men who could not qualify for
voting under the property tests imposed by the state constitutions and
laws. Those would be the men, because I remember reading in my
history book awhile ago, you had to pass a test in order to be able to
vote. I think it was a test of intelligence or something. And if you
failed, you could not vote. If you can’t pass a test, why should you be
smart enough to vote? And your vote would just count in a negative
effect.

CL2: *and women, disfranchised and subjected to the discriminations
of the common law.*

And of course, that’s the one of course, since we’re reading about
women—that jumps out the most at you. Because the other ones back
then you sort of suspect because they were extremely prejudiced
against slaves and even servitude of any kind back then. And
ignorance too, that just jumps right out at you, why can’t women
vote? If they are of age, you know, not a servant, nothing against
their record...why would they not be able to vote? That doesn’t make any sense to me.

CL2: These groups were, therefore, not represented in the Convention which drafted the Constitution.

CL2: So, basically they can’t vote because they weren’t represented in the Constitution.

CL2: except under the theory that representation has no relation to voting.

CL2: You can only vote, if representation has no relation to voting. So it’s like, more or less, they’re never going to be able to vote in 1,000 years (he chuckles). That’s just one of the many examples that existed back then of prejudice of so many forms against women.

CL2 began his analysis by focusing on the author and the date of publication. From that information, he began to view the document as a human artifact laden with meaning indicative of the time, the 1930s. He incorrectly surmised that Beard must have been talking about literacy tests when addressing the four groups of the early republic. He related the Jim Crow laws of the 1930s to the hidden and latent designs of the author. He effortlessly carried his erroneous assumptions and applied them to the task at hand, relating the document to the status of women. Within this paradigm, he questioned why women were not able to vote because he inferred many could pass intelligence tests. By the end of the document reading, he
reconciled his assumptions with the acknowledgment that this was another example of prejudice manifested toward women at the time.

In this excerpt, CL2 came the closest of any of the students to actually invoking the sourcing heuristic. He read the first phrase, and then sourced the document. If he had sourced the document first, it would have qualified as the sourcing heuristic. Wineburg (2001) noted that expert historians nearly always began with a careful contemplation of the source before they engaged in the actual reading of the documents. Students, on the other hand, usually viewed the source as one final bit of information to add to a long list of documentary evidence. To the students, the sources did not carry any special weight in the preponderance of truth. The absence of the sourcing heuristic may be a product of the way history is taught and practiced in the United States and it may also reflect an absence of substantial prior knowledge.

*Primary Sources, Pedagogy, and Practice*

Secondary teachers using primary sources to teach history is a fairly recent phenomenon (Grant, 2003; Wilson & Wineburg, 1993). Only 20 years ago, Goodlad (1984) reported a repetitive cycle of lectures, textbook readings, and quizzes permeating the history classroom landscape. While many teachers continue to uphold the traditional view of history pedagogy, researchers proclaim the potential of primary documents to stimulate an active learning environment (Barton, 2002; Barton & Levstik, 1994; Craver, 1999; Foster, 1999; Foster & Padgett, 1999; Grant, 2003; Kobrin, 1996;
Niemi, 1997; Perfetti, Britt, Rouet, Georgi, & Mason, 1994; VanSledright, 2002; Wineburg, 1991a). Grant (2003) reports that some teachers are frequently incorporating primary sources into their curricula with new textbooks, CD-ROMs, and Internet resources. Moreover, the Advanced Placement curriculum, which continues to expand in the schools, requires a Document Based Question (DBQ), as part of the AP exam, meaning students analyze primary and secondary sources to answer the question together with pertinent outside information (The College Board, 2004). Although the students in the study were AP world history students, according to their teacher, they had not formally studied primary sources at that point in the curriculum. In other words, the study participants may or may not have had much experience with documents at the time of the study. Most likely, because the 10th grade is the first time that students at this high school have an opportunity to take AP courses, the students had little or possibly no meaningful exposure to document-based inquiry. The students appeared to lack the skills for analyzing documents.

Another explanation for the absence of the sourcing heuristic may be the students’ lack of knowledge of history and this time period particularly (Saye & Brush, 1999; VanSledright, 1994). Wineburg (1991a) showed that expert historians did not require specific content knowledge to succeed at the task of analyzing documents related to the commencement of the American Revolutionary War; rather they needed a broad, general knowledge to frame their analyses. The 10th grade students at this school probably lacked the
mental structures of this knowledge because the district social studies curricula place their last history course in the eighth grade. This may explain why, in most cases, the students exhibited a paucity of expert historian heuristics. However, this did not necessarily suggest an absence of learning.

Conceptualizations of Learning History

Students making sense of history invokes many conceptualizations including historical significance, historical time, historical perspective-taking, and historical inquiry. The performance of the nine study participants is discussed with allusions to these conceptualizations.

Historical significance.

When middle school students were asked to choose the most significant images from an array, they usually chose images that were connected with political and social issues. When asked why they chose the particular images, they often stated that they were significant because they showed increased opportunities and expanding civil rights (Barton & Levstik, 1997). The high school students in the present study offered evidence that they viewed the documents as historically significant. The following is an excerpt from HM’s summarization:

And Catharine Macaulay from, “Letters on Education, 1790,” women felt that they were inferior and treated like slaves, even though they lived in the country that stated that they were free and steps higher than other nations, (looks back to Document 2). Women wanted to be treated the same as men. They didn’t want to live a life having to
obey and do everything from a man’s point of view…do everything from a man’s point of view, instead of a woman’s point of view, (looks back to Document 1). They wanted to have the right to speak and hold office and the right to vote, (looks back to Document 7). Even though they’re deprived from all these laws, rights, they still kept fighting on to win these back, (looks back to Document 9). I’m thinking that women had to fight for over 100 years to be able to win the rights that were promised to them at the time of the Constitutional convention was set upon them, there for many years only rich, white, men over 21 years could have the right to vote and hold office and, (looks back to Document 7), that women weren’t…therefore even though women kept fighting on for many years their voices weren’t hear, until they were given the rights over the 20th century.

The researcher originally chose the task and documents based on the notion that the students would find social history interesting. HM supported the idea of historical significance by referring to the expansion of civil rights in the 20th century with the idea that women had to fight over 100 years to achieve those rights. This theme pervaded many of the summarizations. BM remarked, “They said that all people were going to be equal in America, but they weren’t for a very, very, very long time.” CL2 added, “[To] the work of activists, they gained more and more each day.” The study participants appeared to find significance in the documents and view women’s struggles
as an expansion of civil rights. Another possible measure of student learning is how they conceived historical time.

Historical time.

Students in the United States view change as linear and logical, rather than a weighing of evidence (Barton, 1998b). The fact that six of the nine student participants failed to discern differences in the election laws did not prove this contention. But the fact that the three students, who did recognize this aberration, later failed to incorporate it into their schemas, suggested that it was at odds with their conceptualizations of history. Armed with the knowledge that women did not gain the right to vote until the 20th century, the three students chose to ignore the evidence that women of property could vote in New Jersey for a brief moment in time. In other words, their conceptualizations of history were linear, and the 1807 Election Law veered along a different pathway. WC said, “Sounds like the women can vote in this one, it don’t matter if you’re a boy or a girl.” CL2 offered a lengthier interpretation,

More or less, if you qualify correctly, and you have good money to your name and have lived in the place long enough, that you can vote for the member of your township or your township alone. And I assume this would include women. As part of the New Jersey 15th Assembly; they passed the 1790 election law. More voters, and not just the more fortunate white men.

BM took it one step further by declaring,
Here it’s trying to say he or she—that women have the right to vote. I don’t believe that’s right because they weren’t allowed to vote. It’s talking about how you can’t vote anywhere else, except where you live.

All three of the students failed to incorporate this into their summarizations and BM even questioned the accuracy of the document. One plausible explanation is that it did not correspond with their linear conceptualizations of historical time. In addition to historical time, another possible measure of learning is evidence of multiple perspectives and empathy.

*Developing multiple perspectives and a sense of empathy.*

U.S. students fail to analyze changes within societal structures and lack the ability to develop multiple perspectives (Barton, 1998b). In general, most of the student subjects in this study viewed women as one monolithic group who was denied political and legal rights. Document 8 was an advertisement for a young slave girl. The students failed to relate the plight of female slaves to that of white women—to distinguish the lack of political rights with the most basic human rights. While BM, WC, HM, SS, CL, and KT either missed the meaning of the advertisement or essentially repeated the advertisement in their interpretation, CL2 proclaimed, “I’m lost to where it [the document] would relate to women’s rights.” DA took a more empathetic position by declaring twice that it was, “cruel.” About the only reference to multiple perspectives occurred when students talked about Document 9, “The Who Shall Not Vote Law.”
Document 9 states that only citizens who are, “free, white, male citizens of this state, of the age of 21 years, worth 50 pounds proclamation money” may vote. Most of the students seized on this opportunity to comment on class distinctions. CL2 said,

That line here says it all: free white male citizens of this state of the age of 21 years. Basically you have to be white, yet to be male you have to be 21 years of age…basically you have to have age, gender, skin color, and money, of course. That seems like these were probably the most important things back then, and unfortunately, still might be today. This was part of the act of the 32nd Assembly of the State of New Jersey and was passed in 1807. So, this was the law around 1807, and considering the United States is not that old back in 1807, they should’ve been able to change this a long time ago.

Obviously women can’t vote, nor can black people.

CL2 made an attempt to view the election law as denying various social groups the right to vote, but he and the others fell far short of taking on the multiple perspectives related to women’s rights in the early republic. Foster (1999) provides six organizing themes describing historical empathy: (1) creating understanding of why people acted in a certain way; (2) understanding chronology and context, (3) analyzing available evidence, (4) cultivating an appreciation of key people, events, and the surrounding culture; (5) understanding that the past is different from the present; and (6) understanding that human nature is both multifaceted and complex. By these
standards, the students failed to develop many of these key tenets. They never asked why nor did they rigorously delve into the prevailing culture. Moreover, the analysis was often superficial. The final component of students making sense of history is historical inquiry.

*Historical inquiry.*

The task of the study was an exercise in historical inquiry, or a search for truth or knowledge. Foster & Padgett (1999) outline nine considerations for facilitating historical inquiry: (1) the teacher decides the level of freedom the students have in selecting a topic; (2) the teacher enhances student interest in the process; (3) the teacher assists the students in devising doable projects; (4) the teacher considers how much material to provide for research; (5) the teacher assists the students in selecting appropriate information from the sources; (6) the teacher monitors student progress; (7) the teacher aids the development of critical appreciation of the evidence; (8) the teacher lays out a delivery format; and (9) the teacher sets the time constraints. While designing the study, the researcher followed these guidelines. However, if one eliminates the research associated with digital Webquests, a derivative of historical inquiry, only anecdotal evidence exists to determine the effectiveness of the process. Perhaps the summarizations in the present study shed some light on this topic.

Despite all the shortcomings mentioned in relation to lack of heuristics, historical significance, historical time, and the development of multiple perspectives and feelings of empathy, all the summarizations indicated at
least some level of understanding. Every one of the students concluded that
women enjoyed fewer rights than men and that there were individuals who
actually resisted male hegemony. BM summed it up in this way,

It says all men are created equal in the Declaration of Independence,
which is not true when you look at all the documents. They are
talking about how women are almost as far down as slaves. It says all
men—which means race, sex, and it’s totally contradictory. They’re
talking about how slaves have no say in anything. So, the declaration
of independence is very contradictory according to the documents I
just read. They said that all people were going to be equal in
America, but they weren’t for a very, very, very long time. That’s
about it.

Summary of secondary students using documents to learn history.

All the students exhibited at least rudimentary understanding of a subtext
despite the scantiness of expert heuristics. Two of the study participants, DA
and CL2, stand out as exceptions. Each developed sophisticated subtexts and
accounted for slightly over half of the observances of heuristics. The
students failed to hypothesize about the documents based on an examination
of the source before reading the document. This lack of sourcing may be
attributed to how history instructors teach history and the students’ lack of
adequate prior knowledge. The outcomes of the study support previous
investigations of historical significance, historical time, the development of
multiple perspectives, empathy, and historical inquiry. The summarizations
suggest a modicum of success in 10th grade AP students learning the status of women in the early republic. Furthermore, clues emerged suggesting the potential for computer integration.

Computer Technologies and Expert Historian Heuristics

The purpose of this study was to measure expert historian heuristics in the target population in three conditions. With the exception of DA and CL2, most of the students exhibited very few instances of using expert heuristics to perform the prescribed task. The affects of computer technologies were evident while the HTML and Internet groups navigated the documents and when the Internet group members accessed the simulated Internet to clarify their understandings.

Navigating within and between the documents.

Early research on hypermedia indicated that hypermedia was effective for providing information to learners, more sophisticated research designs incorporated performance measures such as detection of expert historian heuristics, hypertext could increase one’s sense of control, and hypermedia did not hurt the outcomes in cases of no significant differences (Ayersman, 1996). More recent studies reported that high-achieving students felt a greater sense of control (Burke et al., 1998; Farrell & Moore, 2000-2001; Wishart, 2000), and experienced positive learning outcomes in a hypermedia format (Baylor, 1999; Brinkerhoff & Glazewski, 2000; Chan & Ahern, 1999). In the present study, manifestations of these outcomes occurred with
the subjects’ movements within and between documents in addition to the use of the simulated Internet.

In general, the students in the HTML and Internet groups navigated freely within and between the documents using the links frame on the main page. When BM originally encountered Document 4, the image of the engraving, she became overwhelmed and declared, “I might come back to this one, I don’t know.” She came back to the document at the end of the session just before she offered her summarization of the task. When KT read the first phrase from Document 3, an excerpt from Alexander Hamilton’s notes at the Constitutional Convention, she clicked on the simulated Internet, read a portion of Hamilton’s biography, returned back to the document, clicked on the back button to reread the first phrase, then proceeded to the remaining portions of the document; she was freely moving between the Internet and within the document. When CL2 read Document 2, he read the first phrase, offered a reaction to it, moved on to the second phrase, then returned back to the first; he was moving freely within the documents. Moreover, the students in the HTML and Internet groups were more likely to view the documents out of order. The only member of the control group to view the documents in a non-sequential order was HM: Document 1, Document 4, Document 3, Document 2, Document 5, Document 6, Document 7, Document 8, Document 9, and Document 10. Even then, HM did not deviate drastically from numerical order. In fact, he became concerned about “missing” a document and returned to a numerical organizing strategy. BM, CL1, KT,
and CL2 from the treatment groups, exhibited a strategy to view and return to documents based on their building up of mental structures. The most frequent strategy was to peruse the beginning of the documents, then return to them later. This strategy may have reflected the effects of hypermedia.

Hypermedia allowed learners to organize their learning environments to maximize learning (Yang, 2000). Students appeared to enjoy the option of going back to previous screens wherever and whenever they wished (Savenye et al., 1996). Furthermore, choosing to read the documents that seemed most important (or less confusing) first, suggested a depth-first approach, which is common to successful readers (Ayersman, 1996). Another perceived advantage of computer technologies is the ability to create authentic learning environments.

*Authentic learning.*

One criticism of the use of instructional technology in the social studies has been that it is used mainly as a tool to retrieve and regurgitate information, rather than a way to facilitate higher-order thinking (Saye, 2002). Furthermore, technology should be used to create “authentic” experiences focusing on deliberating about real issues (Saye, 2002; Shaffer & Resnick, 1999). According to Shaffer & Resnick (1999), thick authenticity is identified by four kinds of authentic learning:

(a) learning that is personally meaningful for a learner, (b) learning that relates to the real-world outside of school, (c) learning that provides an opportunity to think in the modes of a particular
discipline, and (d) learning where the means of assessment reflect the 
learning process. (p. 195)

Instructional technologies provide authentic learning experiences because 
they reflect tasks in the greater society, i.e., the infusion of technology in our 
everyday lives. In the study, the HTML and Internet groups operated in a 
mediated environment, the content was relevant social history, and the mode 
was expertise. The question is: Did any clues emerge during the course of 
the study to support this contention?

One possible manifestation was the ease to which the students in the 
HTML and Internet groups glided through the programs. From the computer 
use survey that was administered in the beginning of the study, every student 
indicated proficiency with computer technologies: the use of email, 
navigating the Internet, and making schoolwork more interesting. Unlike the 
control group, the HTML and Internet groups constantly clicked the “back” 
button within documents to reread troublesome phrases. The control group 
more often trudged forward. Another possible manifestation concerned the 
way in which many of the students manipulated the mouse and pointer with 
the pictorial document and the mouse and cursor with the textual documents.

Students in the treatment groups navigated through the documents using a 
mouse. Most of the time it was a straightforward process of reading and 
clicking. However, during times of heavy deliberation, all the students at 
least once used the pointer or cursor (depending on where they were in the 
program), to emphasize their narrative or facilitate their own understanding.
This seemed particularly useful to the students when they were examining the image of the engraving. In these cases, the students were able to use technology in a utilitarian way to gain personal meanings much like the control group members used their hands and fingers. The mouse became an extension of their physical selves, perhaps implying a thick authenticity. Computer technologies also affected learning when the Internet subjects accessed additional information.

Technological scaffolds.

Incorporating scaffolds into historical inquiries using primary source documents can create effective, authentic learning experiences (Foster & Padgett, 1999). Additionally, teacher scaffolds incorporating hypermedia promote learning efforts (Brinkerhoff & Glazewski, 2000; Yang, 2000). The students in the present study were randomly assigned to three groups: paper documents, HTML, and HTML with limited, simulated Internet access. The Internet group members, KT, CL2, and CS, had the option of clicking on a button to “Find Out More” about each of the documents where they could find additional information that would function like a scaffold to enhance understanding and stimulate expert historian heuristics. Although the three members only clicked on the button a total of 10 times, they seemed to benefit from the experience.

With a total of six trips to the simulated Internet, KT led the group in number of times. She accessed the Internet for Documents 1, 2, 3, 4, 8, and 10. Likewise, she only verbally reacted to the scaffolds in three out of the six
instances. She offered reactions to the scaffolds correlating with Documents 2, 4, and 8. Document 2 was a biography of Abigail Adams, Document 4 was a direct interpretation of the engraving, and Document 8 was a direct interpretation of the slave advertisement. The documents that appeared of no help to her were the complete letter from John Adams to James Sullivan (Document 1), Alexander Hamilton’s biography (Document 3), and James Beard’s biography (Document 10). In terms of the three comments generated to the scaffolds in Documents 2, 4, and 8, all three comments indicated the contextualization heuristic. It is important to note that the three scaffolds that failed to elicit a response from KT all required the making of inferences; they were not direct interpretations of the documents. Both CL2 and CS accessed the scaffolds two times each.

CL2 clicked on the “Find Out More” button for Document 1 twice, the complete letter of John Adams to James Sullivan. Each time he accessed the scaffold he returned with sharpened understanding and provided evidence of the contextualization heuristic. He even prefaced his comments after his first foray with, “I think I have it now.” CS accessed the scaffolds to Documents 3 and 4. After reading a part of the Hamilton biography she announced, “I have no idea what this is saying. He’s a very difficult guy. This is over my head.” And as stated earlier, when she read the direct interpretation of the engraving, she became agitated because it did not conform to her hypothesis about the document. Her disagreement with the interpretation enlightened her understanding and generated comments indicating the contextualization
heuristic. The experience of these three case studies informed the potential and limitations of technological scaffolds using primary source documents.

Potential effectiveness and limitations of technological scaffolds.

Overall, the scaffolds promoted expert historian heuristics, particularly the contextualization heuristic. Of the 10 instances of the subjects accessing the scaffolds, 7 resulted in comments and 6 resulted in the contextualization heuristic. Furthermore, the comments suggested that expert historian heuristics resulted in learning. The students were able to take representations of text and turn it into sophisticated levels of learning using the scaffolds. Limitations also surfaced during the study.

The most obvious question is: If the scaffolds aided in their understanding, why didn’t the students access the simulated Internet more often? Possible explanations include the nature of the scaffolds and the characteristics of the learners. The scaffolds were strategic because they “assist students with determining possible alternative solutions to a problem or alternative interpretations of given data” (Brush & Saye, 2001, p. 337). The scaffolds fell into two categories: Those that required the making of inferences to establish connections to the documents and task; and those that offered a direct interpretation. KT could find no value in the letter to James Sullivan and the two biographies because they required the construction of deep inferences. CS clearly missed the idea of inferences when she accessed Hamilton’s biography, but when given a direct interpretation, she readily consumed the information. CL2, who was already operating on a deeper
level of subtext, gained value from making inferences to John Adam’s letter. So perhaps KT and CS failed to find value in the scaffolds. However, evidence suggests more pertinent reasons.

In a problem-based learning activity using computer technologies, students chose the “path-of-least-resistance” (Milson, 2002). Preconceived notions about the status of women and challenges with new information such as the New Jersey Election Law allowing women the right to vote in 1790 were in direct conflict. CL2 was in tune with many aspects of the subtext, but he too failed to see many nuances because he did not access 9 out of 10 scaffolds. He was comfortable with his narrative as were the other participants. In addition, CS and KT made extraneous remarks that added another dimension to this path of least resistance.

While exiting the room at the end of her session, CS divulged, “I was too lazy to click on the Internet any more.” CS’s remark was evidence that the task had exacted a toll on her cognitive abilities. Perhaps the reading and interpretation of 10 historical documents had been overly taxing. According to the path-of-least-resistance, clicking on the Internet would only exacerbate that feeling. CS may have been lazy. More likely, she was overwhelmed. Further evidence of this possibility happened two days previously when KT participated in the study. At the end of that day, the AP world history teacher visited me to report a conversation that she had with KT following her participation. KT allegedly said, “My head hurts from thinking too much.”
Conclusions and Implications

This study illuminated the potential for computer technologies to facilitate expert historian heuristics: Of the 10 visits to the simulated Internet, 6 yielded evidence of the contextualization heuristic, suggesting that the potential existed for meaningful differences. Expert historian heuristics are teachable concepts that offer students a tool for managing the vast resources of the Internet. Likewise, the fact that most of the students, regardless of condition, incorporated expert heuristics into their summarizations implied that infusing multiple summarizations throughout the inquiry could lead to greater heuristics. Moreover, the value of heuristics may be far greater than earlier imagined because they were often embedded within statements rich with meaning. The investigation also revealed that technology could create an authentic learning experience and allow students greater control over their learning.

Evidence of authentic learning involved applications of real, everyday technology to problem-based learning (Doolittle & Hicks, 2003). As the HTML and Internet group students approached the problem of describing the status of women in the early U.S. republic, they incorporated computer technologies into their organizational strategies and narratives, often using the mouse and pointer like a finger while sometimes moving through the documents in a nonlinear fashion. The movement was also reflected within documents when difficulties arose or clarification was sought. At the same
time, these actions hinted that students were controlling their learning (Burke, 1998; Farrell, 2000-2001; Fitzpatrick, 2002; Pederson, 2002).

The failure of most students to employ expert historian heuristics offers additional implications to how teachers teach history, the context of the cultural wars, and the nexus of technology and textbooks. According to Grant (2003),

They [history teachers] lecture, they assign textbook readings, they pass out and collect worksheets with end-of-chapters questions, and they use a lot of multiple-choice, short-answer, and true-false questions on their exams…Far too many students, current and former, roll their eyes and sigh in response to the history teaching they have experienced. (p. 29)

Moreover, this pedagogy denies students the opportunities to develop higher order thinking skills like making inferences from historical documents. This also calls into question the teacher’s role.

Previous research showed that when technology was successfully integrated into an undergraduate history course, the teacher became a facilitator to student learning rather than the central focus of the class (Milman & Heinecke, 2000). This is not to say that the teacher’s role diminished. When using effective technological scaffolds, the complex interaction between the teacher, student, and scaffolds was found to be critical (Saye & Brush, 2002). Interestingly, the teacher’s role is at the forefront of the cultural wars.

My reading of the most recent period, since the 1980s, is that social studies, as a broad and progressive field aimed at the thoughtful education of citizens in a democratic society, has suffered mightily at the hands of educational reformers bent on turning the clock back to the 1890s, to the re-institutionalization of a traditional academic curriculum in which little attempt is made to connect student learning to broad issues of the past and present, in which socialization and social control are emphasized throughout schooling, and questioning and classroom thoughtfulness are minimized. (p. 523)

How do we reconcile this response to the observation by Grant (2003) that much instruction in a typical history classroom is mind numbing? The present study suggests that a constructivist approach to learning history can be effective when integrating digital documents into the curriculum, which seems to support the position of the National Council for the Social Studies. Yet, this support arrives with a major caveat: Clearly most of these 10th grade AP students lacked the prior knowledge necessary to utilize expert historian heuristics and construct accurate narratives. This is both a sign of a lack of higher-order thinking skills and an avoidance of reading. Perhaps if one views the cultural wars as a symptom of a larger problem, we can begin to focus on the lack of reading in a society mesmerized with digital images. The true culprit may be an avoidance of meaningful reading.
If many teachers still rely on the search-and-find questions found at the end of each textbook chapter, new pathways for learning and teaching must be opened. The walls between the English and social studies departments must crumble because social studies professionals are competing against cultural forces for the students’ intellectual souls. Pre-service teachers should be trained in the skilled reading of texts, the integration of technology, along with other traditional and nontraditional methods of instruction. The marriage of textbooks to computer technologies offers great promise in providing a variety of learning and teaching strategies. Unfortunately, little or no research exists to guide the process. One area of future research could offer suggestions on what combinations maximize learning. The present study may offer some tantalizing clues where educators, textbook publishers, and social studies researchers could come together and integrate their best ideas to teach higher-order thinking skills, rigorous content, and reading. Primary sources accessed with technology, student-centered learning with vigorous teacher support, and well-written, carefully read textbooks may promote expert historian heuristics while enhancing student understanding and appreciation for history.

**Future Research Directions**

As with what often happens in research studies, they address some questions and prompt many more. Future studies with similar conditions may focus on the effects of learner characteristics on the use of expert historian heuristics; the experiences of DA and CL2 suggest that learner
characteristics are important. Likewise, researchers should integrate either compelling incentives or compulsory mechanisms into the Internet condition to foster greater student access to the scaffolds. Additionally, the number of primary and secondary documents should probably be less than 10 in an effort to prevent student fatigue. And finally, scaffolds should contain more direct interpretations.

The implications of this study suggest other directions that could continue the quest for effective ways to promote history learning using computer technologies. Because expert historian heuristics are teachable concepts, one future research direction would be a longitudinal study to determine the effectiveness over time of such a pedagogical and learning strategy. Expert historical heuristics offer great potential in harnessing the power of the Internet in historical inquiry.
References


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Appendices
Document #1

But let us first suppose, that the whole community of every age, rank, sex, and condition, has a right to vote. This community, is assembled—a motion is made and carried by a majority of one voice. The minority will not agree to this. Whence arises the right of the majority to govern, and the obligation of the minority to obey? From necessity, you will say, because there can be no other rule. But why exclude women? You will say, because their delicacy renders them unfit for practice and experience, in the great business of life, and the hardy enterprises of war, as well as the arduous cares of state. Besides, their attention is so much engaged with the necessary nurture of their children, that nature has made them fittest for domestic cares.

Source: John Adams to James Sullivan (1776, May 26). The Founders’ Constitution

Document #2

Patriotism in the female sex is the most disinterested of all virtues. Excluded from honours and from offices, we cannot attach ourselves to the state or government from having held a place of eminence. Even in the freest countrys our property is subject to the control and disposal of our partners, to whom the laws have given a sovereign authority. Deprived of a voice in legislation, obliged to submit to those laws which are imposed upon us, is it not sufficient to make us indifferent to the public welfare? Yet all history and every age exhibit instances of patriotic virtue in the female sex; which considering our situation equals the most heroick of yours.

Appendix A (Continued)

Document #3

The Convention having before it a proposition by Edmund Randolph that “the rights of suffrage in the national Legislature ought to be proportioned to the quotas of contribution, or to the number of free inhabitants, as the one or the other rule may seem best in different cases,” Hamilton “moved to alter the resolution so as to read ‘that the rights of suffrage in the national Legislature ought to be proportioned to the number of free inhabitants.’”


Document #4


Document #5

But whatever might be the wise purpose intended by Providence in such a disposition of things, certain it is, that some degree of inferiority, in point of corporal strength, seems always to have existed between the two sexes; and this advantage, in the barbarous ages of mankind, was abused to such a degree, as to destroy all the natural rights of the female species, and reduce them to a state of abject slavery.

II. And be it further Enacted, That all free Inhabitants of this State of full Age, and who are worth Fifty Pounds Proclamation Money clear Estate to the same, and have resided within the County in which they claim a Vote, for twelve Months immediately preceding the Election, shall be entitled to vote for all public Officers which shall be elected by Virtue of this Act, and no person shall be entitled to vote in any other Township or Precinct, than that in which he or she doth actually reside at the time of the Election;


Verse 1
GOD save each Female’s right,
Show to her ravish’d fight
Woman is Free;
Let Freedom’s voice prevail,
And draw aside the vail [sic],
Supreme Endulgence hail,
Sweet liberty.


Near nine years time of a BLACK GIRL, about nineteen years of age; she is sober and honest, has been brought up in the country, and wishes a situation in it; she will be sold reasonable. Enquire of the Printer. April 24, 1797.

Source: To Be Sold (1797, May 30). The State Gazette & New-Jersey Advertiser Retrieved
Appendix A (Continued)


Period_2/slave.htm

Document #9

Sec. 1. BE IT ENACTED, by the council and general assembly of this state, and it is hereby enacted by the authority of the same, That from and after the passing of this act, no person shall vote in any state or county election for officers in the government of the United States, or of this state, unless such person be a free, white, male citizen of this state, of the age of twenty-one years, worth fifty pounds proclamation money, clear estate, and have resided in the county where he claims a vote, for at least twelve months immediately preceding the election.


Document #10

In an examination of the structure of American society in 1787, we first encounter four groups whose economic status had a definite legal expression: the slaves, the indented servants, the mass of men who could not qualify for voting under the property tests imposed by the state constitutions and laws, and women, disfranchised and subjected to the discriminations of the common law. These groups were, therefore, not represented in the Convention which drafted the Constitution, except under the theory that representation has no relation to voting.

Appendix B: Expert Validation Survey

Website Evaluation Sheet (Bunz, 2001)

Please circle the tool number you are evaluating:

<table>
<thead>
<tr>
<th>Tool 1</th>
<th>Tool 2</th>
<th>Tool 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – strongly disagree</td>
<td>2 – disagree</td>
<td>3 – neutral</td>
</tr>
</tbody>
</table>

*Please circle the appropriate number and justify your response with written comments. Use the back of this sheet if further space is necessary.*

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Information appears to be organized logically on the screen</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>The use of color helps to make the displays clear.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The information on the screen is easy to see and read.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Overall, screens appear uncluttered.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>It is easy to find desired information in this website</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Overall, the website is easy to use</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>The method of selecting options (e.g., buttons) is consistent throughout the website.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>From the user’s point of view, the content of the website is complete.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>From the user’s point of view, the website is well and clearly organized.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Overall, the website is consistent.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Reason for your score:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overall, I would rate the usability of this website (please circle):

<table>
<thead>
<tr>
<th>Usability Level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Usability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Participant Survey (Wineburg, 1991b)

DIRECTIONS: Complete the following information about yourself by filling in the blanks and checking the response:

1. Name __________________________________________
   Grade __________
   Female ___  Male ___
   Age _____

2. I enjoy studying history:
   Always ___  Most of the time ___  Sometimes ___  Once in a while ___
   Never ___

3. On an average weeknight, I spend this much time doing homework:
   More than 3 hours ___  2-3 hours ___  1-2 hours ___  Less than 1 hour ___

4. I enjoy reading books:
   Always ___  Most of the time ___  Sometimes ___  Once in a while ___
   Never ___

5. After graduating from high school, I plan on:
   Getting a job ___  Going to a 2-year college ___  Going to a 4 year college ___
   Unsure ___

American History Pretest (Blume, 1996)

DIRECTIONS: Circle the correct answer:

1. Americans objected to the Tea Act because
   a. tea would cost more
   b. it forced them to buy from the British East India Tea Company
   c. it forced them to drink tea instead of coffee
   d. the tax would be used to pay the royal governors’ salaries

2. Which of the following nations was first in the new explorations that began in the fifteenth century?
   a. England
   b. Portugal
   c. Spain
   d. France
3. Which section of British North America enjoyed the highest standard of living in the eighteenth century?
   a. the Chesapeake
   b. the mid-Atlantic
   c. New England
   d. the tidewater

4. The proposal to create a single-chamber congress in which each state had an equal vote was known as the
   a. New Jersey Plan.
   c. Three-fifths Plan.
   d. Virginia Plan.

5. The Embargo Act
   a. badly damaged the British economy.
   b. stimulated the growth of manufacturing in the United States.
   c. convinced the French to drop their trade restrictions against the United States.
   d. was favored by New England but resisted in the South.

6. All of the following were founded as utopian communities except
   a. New Harmony, Indiana
   b. Oneida, New York
   c. Brook Farm, Massachusetts
   d. Rochester, New York

7. Pidgin was the
   a. language forced upon the slaves by their white masters.
   b. language of American-born slaves.
   c. area in Africa where most slaves originated.
   d. secret tongue used in slave resistance.

8. Which sector of the economy did not prosper in the 1920s?
   a. manufacturing
   b. agriculture
   c. the “service” sector
   d. financial services

9. The first skyscraper was built in
   a. Boston
   b. Chicago
   c. Philadelphia
   d. New York City
Appendix C (Continued)

10. All the following are considered major Great Society programs except the
a. Voting Rights Act
b. Medical Care Act
c. Appalachian Regional Development Act
d. Interstate Highway Act
Appendix D: Parental Consent and Child Assent Form

Parental Informed Consent
Social and Behavioral Sciences
University of South Florida

Information for People Whose Children Are Being Asked to Take Part in a Research Study

The following information is being presented to help you decide whether or not you want to allow your child to be a part of a minimal risk research study. Please read this carefully. If you do not understand anything, contact the researcher and social studies teacher at Robinson High School, Daniel Stuckart at (813)272-3006.


Person in charge of study: Daniel Stuckart

Where the study will be done: Robinson High School

Your child is being asked to participate because she/he is a high achieving AP World History student who scored at or above a 75 national percentile on the norm-referenced FCAT reading test.

General Information about the Research Study

The purpose of this research study is to measure expert historian heuristics (guiding principles) while your child examines 10 brief historical documents.

Plan of Study

Your child will fill out a short general survey, a ten-item multiple-choice test, and a brief computer use survey at the FIRST meeting during their regular AP World history meeting time. This should take approximately 15 minutes. The researcher will also review your child’s records including grade point average and FCAT scores. Your child was selected because she/he met the criteria of a minimum non-weighted GPA of 3.0 and FCAT norm-referenced reading score of 75. Using a random selection process of assigning and subsequently drawing numbers of eligible volunteers, nine subjects will participate in a one-period session (90 minutes). Six students will also be selected in this manner as alternates.

During the session, your child will read nine brief historical documents and analyze one image. She/he will be asked to reason aloud and the session will be videotaped for analysis. Your child will be reading paper documents (control group) or computer-based sources (treatment groups). At no time will your child be on the Internet. One subject per day will meet the researcher during third period to conduct the study. A schedule will be arranged in advance.

Payment for Participation

Your child will not be paid for participating in this study. Ms. Hammontree, the AP World History teacher, has agreed to award participation extra credit points in the 2nd nine-weeks grading period of 200 substitutable extra credit points equivalent to dropping one test or two daily assignments.

Benefits of Taking Part in this Research Study

Your child will experience an interesting history lesson about the status of women following the American Revolution. If your child plans on taking AP US history in the eleventh grade, this could help promote required knowledge of a complicated topic.
Appendix D (Continued)

Risks of Being a Part of this Research Study

The risks associated with this study are minimal: Your child will be counted as present during 3rd period, but she/he is responsible for making up any missed work. The study itself causes no risks.

Confidentiality of Your Child’s Records

You and your child’s privacy and research records will be kept confidential to the full extent required by law. Authorized research personnel, employees of the Department of Health and Human Services, and the USF Institutional Review Board and its staff, and any other individuals, acting on behalf of USF, may inspect the records from this research project. The results of this study may be published. However, the data obtained from your child will be combined with data from other children in the publication. The published results will not include your child’s name or any other information that would personally identify your child in any way. All data collected as part of this research study will be shredded/destroyed three years after the study is finished. The researcher is required to keep all data for a minimum of three years after the close of the study. It will be kept in a locked file cabinet at the researcher’s residence.

Volunteering to Take Part in this Research Study

Your decision to allow your child to participate in this research study is completely voluntary. Your decision about allowing your child to take part in this study (or not to take part) will in no way affect your child’s AP World History grade or student status. You are free to allow your child to participate in this research study or to withdraw her/him at any time. If you choose not to allow your child to participate or if you remove your child from the study, there will be no penalty or loss of benefits that you or your child are entitled to receive.

Questions and Contacts

- If you have any questions about this research study, contact Daniel Stuckart at (813)272-3006.
- If you have questions about your rights as a person who is taking part in a research study, you may contact the Division of Research Compliance of the University of South Florida at (813) 974-5638.

Consent for Child to Take Part in this Research Study

I freely give my consent to let my child take part in this study. I understand that this is research. I have received a copy of this consent form.

________________________ _ _______________________
Signature of Parent Printed Name of Parent
Date

Please initial the yes or no boxes for each of the following permission statements:

1. I agree to allow my child to be videotaped for this research project. yes no
Appendix D (Continued)

2. I agree to allow the researcher to review my child’s records/scores. □ □

**Investigator Statement:**

I certify that participants have been provided with an informed consent form that has been approved by the University of South Florida’s Institutional Review Board and that explains the nature, demands, risks, and benefits involved in participateing in this study. I further certify that a phone number has been provided in the event of additional questions.

________________________________________
Signature of Investigator

________________________________________
Printed Name of Investigator

Date

**Child’s Assent Statement**

Mr. Stuckart has explained to me this research study called Secondary Students Using Expert Heuristics in the Analysis of Digitalized Historical Documents: A Mixed Methods Approach.

I agree to take part in this study.

________________________________________
Signature of Child

taking part in study

________________________________________
Printed Name of Child

Date

________________________________________
Signature of Parent

of child taking part in study

________________________________________
Printed Name of Parent

Date

________________________________________
Signature of person

obtaining consent

________________________________________
Printed Name of person

Date

obtaining consent
Appendix E: Script for Control Group

The researcher will read the following script to the participants after they are initially informed of the task and have had an opportunity to practice the think-aloud protocol:

As you just read, you will be examining 10 historical documents relating to women in the early years of the United States Republic. You will have two passes to accomplish the task. The first pass will be a complete reading of all the documents in order of the list. You will only read the documents at this time. This will help you gain familiarity with the task.
Do you understand what you will do on the first pass?

After completing the first pass, we will begin the think-aloud protocol. The documents will be fragmented into pieces to help you express your thoughts. You may take your time in reading through the documents as long as you complete the task in the 45-minute time period.
After the first pass, how much time do you have for the second?

You may read any document in any order and you may refer back to documents you have already read.
What order can you read the documents?
Can you return to a document?

You must read every document at least once.
What is the minimum amount of times that you must read every document?

You may read anything on the document page at any time.
What are you allowed to read on the page?

When you feel that you have developed a complete understanding of the status of women and have read every document at least once, or the time is near end, you will be asked to summarize your findings.
What will you do at the end of the task?

We will now begin the first pass. We will review the rules again after this pass.

Select the first document to begin.
Appendix F: Script for Treatments Groups

The researcher will read the following script to the participants after they are initially informed of the task and have had an opportunity to practice the think-aloud protocol:

As you just read, you will be examining 10 historical documents relating to women in the early years of the United States Republic. You will have two passes to accomplish the task. The first pass will be a complete reading of all the documents in order of the list. You will only read the documents at this time. This will help you gain familiarity with the task.

Do you understand what you will do on the first pass?

After completing the first pass, we will begin the think-aloud protocol. The documents will be fragmented into pieces to help you express your thoughts. You may take your time in reading through the documents as long as you complete the task in the 45-minute time period.

After the first pass, how much time do you have for the second?

You may read any document in any order and you may refer back to documents you have already read.

What order can you read the documents?

Can you return to a document?

You must read every document at least once.

What is the minimum amount of times that you must read every document?

You may read anything on the screen at any time.

What are you allowed to read on the screen?

When you feel that you have developed a complete understanding of the status of women and have read every document at least once, or the time is near end, you will be asked to summarize your findings.

What will you do at the end of the task?

We will now begin the first pass. We will review the rules again after this pass.

Select the first document to the left to begin.
Appendix G

Computer Use Survey (Montgomery County Public Schools, 1998)

1. Please indicate at which of the following times you used a computer LAST WEEK.
   Last week I used a computer…
   
<table>
<thead>
<tr>
<th>Time</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the lunch period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During study period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After school</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Please indicate whether you have done any of the following tasks within the PAST WEEK.
   Last week I…
   
<table>
<thead>
<tr>
<th>Task</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sent an E-Mail Message</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read an E-Mail Message</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used the Internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downloaded information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used Microsoft Explorer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Last week, how many hours did you spend using a computer?
   ___ I didn’t use a computer
   ___ Less than 1 hour
   ___ 1 to 3 hours
   ___ 4 to 6 hours
   ___ I spend more than 6 hours

4. I find computers make schoolwork more interesting.
   ___Strongly            ___Agree          ___Neutral            ___Disagree
   ___Strongly
   ___Agree
   ___Neutral
   ___Disagree

5. Using computers helps me do better on my schoolwork.
   ___Strongly            ___Agree          ___Neutral            ___Disagree
   ___Strongly
   ___Agree
   ___Neutral
   ___Disagree

6. How would you rate you computer abilities?
<table>
<thead>
<tr>
<th>Extremely Poor</th>
<th>Below Average</th>
<th>Average</th>
<th>Above Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H
Sample Computer Screen Images

On July 4, 1776 the American revolutionaries issued the Declaration of Independence proclaiming,

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed."

Nearly eleven years later the founders of the Constitution met in Philadelphia to devise a new government based on the ideals of the Declaration of Independence. You will analyze 10 documents relating to the first constitutional convention. You will have an opportunity to read all the documents thoroughly in the first part. On the second pass, you will be asked to reason about while performing the provided tasks. Also, at the time you may choose to look at any document in any order, although you must examine every document at least once. The task is as follows:

Describe the status of women in the early years of the United States relative to the ideals of the Declaration of Independence.

NEXT

Document Links:
1. John Adams
2. George Mason
3. James Madison
4. Preamble
5. Bill of Rights
6. The Bill of Rights
7. "Rights of Women"
8. "To Be Right"
9. "A Man Shall Not Vote"
10. "Equality Before"

The Convention having before it a proposition by Edmund Randolph that "the rights of suffrage in the national Senate ought to be proportioned to the quotas of representation, or to the number of free inhabitants; as the one or the other rule may seem best in different cases," Hamilton "moved to alter the resolution so as to read that the rights of suffrage in the national Senate ought to be proportioned to the number of free inhabitants."


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Appendix I (Continued)

We hold these truths to be self-evident: that all men are created equal, that they are endowed by their Creator with certain inalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. —That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed. —A Declaration of Independence, 1776

The statue of liberty was set up by France as a gift to the United States in the shadow of the Declaration of Independence.


Document Links:
1. John Adams
2. Alexander Hamilton
3. Thomas Jefferson
4. Thomas Paine
5. Benjamin Franklin
6. The Declaration Law
7. Statue of Liberty
8. "Liberty"
9. "In God We Trust"
10. Ouida Beaux

She is sober and honest, has been brought up in the country, and wishes a situation in it.

Click Here to Find Out More