The Impact of Using Digital Timelines in the Social Studies Classroom

Elizabeth K.Wilson
Vivian H. Wright
The University of Alabama

Ann-Marie Peirano
Hillcrest High School

Abstract

In this study, the process and effects of integrating an innovative technology were examined in one U.S. history teacher's classroom. Specifically, the impact on the teacher and the students from using digital timelines to understand history are presented. Recommendations from this study include: (a) the importance of examining and including a variety of documents to present multiple perspectives and to portray different voices in a digital timeline, (b) the need for the teacher to articulate and describe the how and the why of the digital timeline assignments as it relates to understanding historical content knowledge, and (c) the need for students to think critically about the dates, events, and figures included in their timelines.

Introduction

Today's students are deluged with visual and auditory images from video games to podcasts and other multimedia uses in the classroom. With the multiple images and opportunities to communicate and express oneself in today's digital world, social studies teachers are challenged to ensure students make sense of visual complexities and make the appropriate connections to social studies content. Teachers must consider how students read images in the classroom, address visual literacy, and use images to construct historical literacy (Hofer & Swan, 2005). Opportunities for learning with visual sources offer opportunities for students to enrich their "repertoires of cognitive skills and gain access to powerful new tools of creative thought…" (Messaris, 1998, p. 70). Further, for the student, working with digital images can be engaging and motivating (Van Scoter, 2004).

Visual images combined with technological applications have the capability of changing the often teacher-centered, transmission dominated social studies classrooms. However, the integration of technology should take place with careful preparation and thought by teachers and students. According to Mason, Berson, Diem, Hicks, Lee, and Dralle (2000) technology should be—(a) be "introduced in context," (b) "extend learning beyond what could be done without

technology, and (c) "be used to encourage inquiry, perspective taking, and meaning making" (p. 108). To achieve this, a paradigm shift from teacher-centered to student-centered social studies instruction, which places an emphasis on cooperative learning and collaboration, should occur; this shift can be facilitated by multimedia and web authoring software (Fairey, Lee, & Bennett, 2000).

Although many educators (K-16) promote the implementation of technology, Whitworth and Berson (2003) wrote of a concern that technology integration in the social studies classroom is sometimes viewed as a more expensive, innovative way to meet the same outcomes as those met with traditional teaching methods. Despite a focus on technology integration/ implementation at national conferences and application articles in national journals (Shiveley & VanFossen, 2001), little research has been conducted in "technology-rich, student-centered" social studies classrooms (Saye & Brush, 2002, p. 80). Such research…"must also act as a feedback mechanism to correct either the learner and/or the system toward defined goals" (Diem, 2000, p. 498).

Whitworth and Berson (2003) noted the need for studies that illustrate the effect of technology on student learning. The National Assessment of Educational Progress, which examines student learning and how they learn at grades 4, 8, and 12, reported results (NAEP, 2002) for computer use in history classes, which illustrated a strong relationship between computer use and writing reports for students in grades 8 and 12. However, the report also noted that students who used computers daily in grades 4, 8, and 12 had lower scores on the NAEP than those who did not. However, the report recognized that few students used a computer for history or social studies. Given that few students in this national report indicated using technology, we must further explore and identify "why and how technology can be used to facilitate the creation of meaningful and disciplined knowledge within each student and not to serve as a substitute for knowledge creation or for traditional classroom 'teacher talk'" (Hicks, Doolittle, & Lee, 2002, p. 2185).

In the history classroom, technology can be used to facilitate historical thinking. Historical thinking encompasses the "doing of history," including chronological thinking, historical comprehension, historical analysis and interpretation, historical research, historical issues analysis, and historical decision making (National Standards for History, 1996). Digital images hold the potential to facilitate these skills and understandings. "Historical images, in particular, are a useful point of entry for many students…and easily evoke background knowledge that children can begin using in building an interpretation" (Tally & Goldenberg, 2005, p.3). As it relates to the use of historical documents, historical thinking encompasses how students think about the document's author and its creation, the context (time and place of the document), the language used in the document, and the consideration of multiple sources and documents (Wineberg, 2001). Using digitized primary sources, Tally and Goldenberg concluded that advanced placement (AP) students, non-AP students, as well as middle school students, all performed well in regard to historical thinking as defined by Wineburg (2001), Seixas (1998), and Stearns, Seixas, and Wineburg (2000). In addition, the students felt they learned more history from this digital historical inquiry (Lee, 2002), enjoyed it more, and felt they worked harder than in past history classes.

When considering a new approach to teaching history by integrating digital primary sources, the role of the teacher must be one of providing guidance in order to avoid unrelated or fragmented information (Fairey, Lee, & Bennett, 2000). Furthermore a teacher's "knowledge and beliefs about learning exert a powerful influence on their planning and implementation of

instruction; their prior conceptions act as a lens, and these conceptions shape their responses as they consider how, or whether, to modify their practices" (Barton & Marks, 2000, p.4). It is important for a teacher to reflect upon the meaning of the old adage, *using technology to enhance teaching and learning*. Even through careful preparation and planning, using technology does require a certain amount of trial and error. Gibbons and Jones (2004) found that teachers must gain experience by trial and error, reflect upon their experiences, and allow for growth and change.

The purpose of this study was to examine the impact on teacher and student learning when implementing a digital timeline project with two U.S. history classes. The teacher/ researcher, after participating in the Teaching American History Program and Master Technology Teacher (MTT) Program at the researchers' institution, learned how to use a digital tool, Microsoft's Photo Story 3, to create historical concepts through a multimedia approach. Photo Story 3 is a multimedia software program which allows the user to add motion, text, and music to still images. The teacher believed using this tool would be motivating and engaging to her history students. Collaborating with the other two research team members, she developed the historical timeline lesson plan and a rubric to evaluate the lesson based on multimedia concepts and historical content use in the timeline. Specifically, the teacher/researcher sought to use this assignment as a culminating activity in which students researched and evaluated the causes of the American Revolution, the circumstances surrounding how the colonists won independence, and the significance of the American Revolution to U.S. history. The researchers' intent was to study the practice of using technology to enhance *teaching* and *learning* as it occurred in the teacher researcher's classroom. Thus, the framework of this study was one similar to that used by Brush and Saye (2002) of design experiment through use of an innovative teaching technique. Specifically, the following overarching research questions guided the study:

1. What is the impact of the integration of digital timelines on U.S. history students?
2. What is the impact of the integration of digital timelines on a U.S. history teacher?

Methods

For this study, the researchers employed a qualitative approach (Patton, 1990; Punch, 1998) to determine how the students were using multimedia tools to understand the historical content and to assess the teacher's perceptions of the experience. More specifically, the "processes and effects" (Saye & Brush, 1999, p. 479) were examined on integrating technology into this learning experience in the history classroom. Our study did not intend to examine what was occurring in a controlled environment, but rather to observe what was taking place for students and the teacher as they engaged in this process (Saye & Brush, 2002).

Participants and Setting

The study took place in a high school in the southeastern U.S. during one fall semester. During the time of this study, the teacher taught two U.S. History 10 classes. One class consisted of 32 10th grade students enrolled in *Advanced U.S. History 10 (Early U.S.)*. The class had 13 male, 19 female, and 12 African American with 20 Caucasian students respectively. The other *U.S. History 10 (Early U.S.)* class was comprised of 27 students—13 male, 14 female, 23 African American, and 4 Caucasian students—and was not designated as an advanced course.

The classes were taught on the block schedule for the duration of 98 minutes; at the time of this assignment, the students were learning about the American Revolution. The teacher, a Caucasian female, was in her second year of teaching and a member of the three-person research team. She had participated in the Teaching American History grant and also a year-long technology program (MTT) sponsored by the university. The other two members were university faculty, with one specializing in social studies education/research and the other specializing in instructional technology research.

Description of Digital Timeline Project

The history students participated in and completed the process over a five-day period. For the first three days, 20-25 minutes of work was completed during each 98-minute class period. During day one, the digital timeline project was introduced and a description of the Microsoft program, Photo Story 3 was given. For the timeline, students were assigned to locate a minimum of nine significant events/people important to the American Revolution. As part of the timeline, students were instructed to include the ideas and supporting documents in their timeline. Students were also encouraged to include original artwork depictions for the timeline. Technical requirements included using appropriate music, developing a 1-2 minute presentation, and adhering to copyright and fair use guidelines. The grading rubric, based on multimedia elements (e.g., music, text) and historical content research (accuracy, scope) and an assessment scale of unsatisfactory (0), satisfactory (2), and superior (4) was provided to the students. An example of a Photo Story 3 timeline completed by the teacher was presented, and groups were formed. Before students were placed into groups, students with high-level technology skills were identified, and at least one of these students was placed in each group. On day two, the groups conducted initial research on the American Revolution and decided which events their timeline would cover. Collaboratively, the groups chose which event on their timeline each member would research and a sheet was turned in with the names listed; students began initial research. On the third and fourth days, the students researched their events in the library. In the library, every member of the group typed his/her text from research previously completed; text typed into Microsoft Word was copy/pasted into Photo Story 3 frames. Each group member located pictures and saved them to floppy disks; some members of the group consolidated their pictures/text onto a group USB removable storage device which was provided by the teacher. On the fifth day, the actual American Revolution digital timeline was completed. This project allowed the students to conduct Internet searches for content, graphics, and music. The teams used a variety of search engines and learned to evaluate Internet sites in order to ascertain which sites were credible and which sites were not. In addition, they were exposed to the different kinds of removable storage available and how to use that storage. By grouping students who had more advanced technological skills with novice technology users, the project produced a peer-tutoring type effect with regards to technology use.

Data Sources and Analysis

This qualitative study included data from various sources. Assessments of the digital timelines included two rubrics: one based on multimedia/historical research and the other based on elements from the National Standards for History. During the implementation of the digital timeline project, the classes were observed by two researchers. Field notes were also collected

and focused on the interactions of the students/teacher and the discussions of the content and technology. At the conclusion of the assignment, a rubric based on multimedia components and historical content was used to evaluate each digital timeline. After an initial assessment of the assignment, the teacher recognized that the rubric emphasized students' technology skills more than their historical understanding of the content. Consulting with the other members of the team, the teacher developed a second rubric which addressed the historical thinking of the students (chronological thinking, historical comprehension, historical analysis and interpretation, historical research capabilities, and historical analysis and decision making). This rubric assessed the digital timelines on a scale of 1-3 based on the degree to which the timeline accomplished the standard (1-lowest, 3-highest).

To ensure trustworthiness and to achieve triangulation (Lincoln & Guba, 1985), our analyses included coding observation notes and teacher reflective notes, careful reading and re-reading of all data, and rubric analyses of the digital timelines by the three researchers. Ongoing analyses throughout the experience allowed the researchers to clarify issues and to make necessary adjustments.

Findings

The purpose of this research project was to analyze the possible impact of using digital timelines to enhance teaching and learning for and in the U.S. history classroom. This section will focus on the effects of the research on the students and teacher respectively.

Impact on Students

Student Perceptions

Students, using the digital timelines to learn historical content, overwhelmingly felt more engaged in the learning process than with other types of assignments in the history classroom. One student wrote that the digital timeline was "…more fun than just typing a paper." Another student indicated that he wanted to "…use this (Photo Story 3) outside of school!" While observations and written student comments revealed that most of the students were positive about the digital timeline project, there were some differences in their perceptions of the technology and the content. The multimedia aspect of the project was the feature which captured student interest the most. Students commented on how enjoyable it was to select music and graphics to accompany their content information and also how rewarding it was to compile all components together for a finished product. When asked about how he and his group approached the tasks involved in the timeline, one student commented, "We got the boring stuff out of the way first and found all of our years and words first and then we spent the rest of the days getting good music and pictures because that was the best part." Another student said, "The best thing about the project was getting to put everything together, all the music, pictures, and words because there were a bunch of transitions we could use that made everything look good."

When asked to give feedback on other student presentations, the vast majority of comments focused on the multimedia components rather than the historical content. One question posed to students as they watched other groups present was, *What was the best part of the digital timeline?* One student wrote, "The music really tied in with the presentation and it was really easy to read." Another responded, "The music was real interesting and just made the

presentation. Very inspiring! The pictures were really good and clean. Was so cool when the music ended!" Likewise, when asked what needed to be improved with other student projects, historical content was mentioned very little. A student wrote, "The font in some parts was not clear." Another wrote, "The word slides could be better organized and shorter…." One tenth-grade female student responded, "Pick different music, that music was kind of annoying."

For the first time, many students had the opportunity to blend graphics, content, and music together for an academic purpose. In order to achieve the minimum score on the multimedia rubric, all teams had to master the Photo Story 3 technology, which required them to acquire or develop certain technological skills. The basic skill of saving pictures and music was introduced to some students for the first time. As a result, some students did express concerns about the time and effort involved in the digital timelines. One noted the trade off, "Writing a paper would be easier, but with this, we learn how to use a computer."

Based on the student feedback, many students noted that the digital timeline project increased their understanding of the American Revolution and that they would retain the information when the project was finished. A student replied, "I feel like I really know all of the events we put on the timeline because I had to read so much about them and be able to rewrite it in my own words." A student answered, "I hope we have a test on this stuff. I bet I could even get the dates right." However, comments such as the following were also given, "I already don't really remember much about what the project was about, but I remember the songs everybody used!"

Rubric Analyses and Other Results

With regards to the original grading rubric (multimedia rubric), the majority of both advanced and non-advanced student groups received passing scores, with some receiving superior scores. Most advanced students had few spelling and grammar errors, while this was common among non-advanced student groups. All groups excelled in the categories of graphics, music, and creativity. However, groups who received less than a grade of superior for "overall design appeal" generally used pictures that were too small and appeared blurred during the presentation. Another common design flaw was text that was too small or use of a color that washed out text. Approximately half of all groups had some copyright violation; usually the violation was improper use of copyrighted pictures. Students across all groups also received lower rubric scores in the category of clarity of content/research, as they consistently did not support their understanding of the content with historical data. This pointed to the need for a second rubric to further evaluate students' historical thinking.

Although all of the timelines met the minimum score on the first rubric, the second analysis emphasized that some of the timelines were disjointed and the historical interpretation and presentation of multiple perspectives were lacking. Through evaluation using the second rubric, the students received the highest scores on chronological thinking. While some groups did not chronologically sequence their events, most groups did. On the other hand, the students scored the lowest in the area of historical comprehension and historical decision making. For the most part, the timelines did not provide multiple perspectives. Specifically, a voice for the British was lacking.

There were few differences across the groups selected from the advanced and non-advanced classes in terms of historical thinking in what was presented in the timelines. Although the students presented numerous examples of primary documents and artwork depictions in their

timelines, the students did not make historical connections between them and their significance to the people and events in their digital timelines. Although one group did select the publication of *Common Sense* as an important event and included representations of Thomas Paine and the document, the timeline failed to analyze or explain the historical significance of Paine or the document.

Additional Results

The teacher perceived that students in the non-advanced class were especially motivated after developing the digital timeline. Although many of these students did not score superior in the area of historical significance on the rubrics, most of them were better able to analyze the significance of historical events on the culminating unit test. It is important to note that several non-advanced students who had not previously attempted to respond to essay questions on previous tests did so after completing the American Revolution digital timeline assignment.

Impact on Teacher: Teacher Reflection

Following the full implementation and assessment of the assignment, the teacher wrote the following reflection, summarizing her perceptions of how the digital timeline impacted teaching and learning outcomes:

> When planning for the American Revolution digital timelines, I was hesitant to invest so much instructional time in one project. The timelines required up to half of a ninety-eight minute block on three different days and two full blocks of computer work. In addition, the preparation time was also extensive. Despite these challenges and misgivings, I found the project to be valuable as an educational tool in several different areas.

> Before beginning the project, I anticipated hesitation and resistance from students concerning learning how to use the Photo Story 3 program. However, the vast majority of students found it very easy to use and enjoyed the experience. It was rewarding to watch the students rely on one another for assistance and to watch them use their creativity to produce a finished product. Unlike other activities conducted with these groups of students, not very often were they off task as they enjoyed the process of creating the digital timelines. In addition, general technology skills and familiarity with technology were gained which saved instruction time in the long run as these skills were utilized later in other projects. For example, when introducing other assignments using technology, I did not have to discuss how to save files, what search engines to use, or copyright and fair use policies because the students had already been taught and practiced these skills and issues during creation of the digital timelines. However, while most of the timelines were technically pleasing for the level of student creating them, I became concerned that there was a lack of content analysis.

> Due to the nature of the Photo Story 3 program, adding large amounts of text to the digital timeline was not practical. Unfortunately, this limited the amount of content presented, and more importantly, it limited analysis of the historical content. Upon evaluation of the timelines, I found that very few students, advanced or non-advanced,

went beyond mere presentation of factual information. Dates, names, and battles were presented, but there was no interpretation of this information. However, I realized that this was not simply a by-product of the Photo Story 3 program but it was also because I had not clearly asked the students to interpret or draw conclusions based on the information gathered. The original rubric required students to explain the historical significance of the facts presented but as I introduced the project I did not adequately emphasize this aspect of the timeline. If students were specifically required not only to gather factual information but also to analyze that information, it could be easily incorporated into the digital timeline. Even with this limitation on the original project, I still found that when students were asked to write a cause and effect essay on an American Revolution culminating test they showed more sophisticated and higher level thinking than on previous topics.

Discussion and Implications

Most of the students participating in this digital timeline activity were more engaged and enjoyed studying history (Saye & Brush, 2002; Tally & Goldenberg, 2005; Van Scoter, 2004) more than during previous history units. Although it was not our intent to examine differences of students at the different class levels (advanced and non-advanced), results revealed that this project especially motivated the students in the non-advanced class and apparently provided confidence to them in terms of learning historical content as evidenced by student attempts to respond to essay questions on later tests.

However, the students' timelines did focus on the aspects of a traditional timeline which emphasizes factual information such as names, dates, and battles. While the students perceived that this process provided them with a greater capability to recall dates and events, the content rubric analysis revealed, for the most part, that the students did not engage in a variety of historical thinking processes (e.g., Wineberg, 2001) in the digital timelines, with the exception of chronological thinking.

To address this, teachers must consider how images are read to construct knowledge (Hofer & Swan, 2005). "For many teachers, it is common to use historical images simply as *illustrations* of established fact, than as data from which to reason about past" (Tally & Goldenberg, 2005, p. 4). For this project, the opportunity to delve into "deeper" historical thinking for most students did not occur because the assignment did not call for this. Upon reflection, the researchers concluded that further development of the assignment would promote extended learning that could encourage inquiry and meaning making in the context of the assignment (Mason et al, 2000). The teacher should encourage students to explain why each event or person was selected for the timeline. Additionally, the students should be required to analyze and make connections between historical events/people and the documents and visual images (e.g., artwork) included in their digital timelines. Students should also be encouraged to select a variety of documents/images to present multiple perspectives and portray different voices.

A teacher implementing a new innovative teaching method should reflect upon his/her practice (Barton & Marks, 2000; Gibbons & Jones, 2004), evaluate the technology used, and be willing to change (Diem, 2000), if needed, during the actual implementation. Of particular importance to the teacher is specifically identifying why and how technology can be used to facilitate the creation of meaningful and disciplined knowledge (Hicks, Doolittle, & Lee, 2002).

This was evident to the research team from the second rubric's results versus the first, in which the rubric was primarily designed to evaluate multimedia use and was technology based. As educators integrate technology into their pedagogy, it is important that technology not be used for *technology's sake*, but because it will strengthen students' content knowledge or other academic/life skills. The teacher in this study recognized this during the project, made changes and plans to refine her teaching practices for future lessons based on the results of this study.

Although the teacher noted that it took much more time to prepare for the projects, she felt the effort and time did not negate the benefits of the project, particularly for the non-advanced classroom students who performed better on the follow-up examination (Whitworth & Berson, 2003). This further speaks to the need to participate in trial and error activities and the importance of teacher reflection upon those activities (Gibbons & Jones, 2004). For example, the teacher discovered the need to further articulate and describe the *how* and the *why* of the assignment as it related to understanding historical content knowledge.

While this study was limited to one teacher's use of one type of technology in her classroom and cannot be generalized, the use of this one innovative technique did prove useful in the students' learning. Although educators are bombarded with requirements to demonstrate data- driven results, particularly in the form of test scores, for this teacher, the study illustrated a change in motivation which extended past the actual assignment or was measurable by a test score (e.g., motivation, confidence). Studying the processes and effects (Saye & Brush, 1999) of integrating technology into the learning experience also helped the teacher and the research team to identify areas of strengths and weaknesses and to act upon what they learned. Future explorations of why such an innovative technique appeared to be more motivating to the non-advanced group of students are needed.

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