Recasting the Textbook: Student Creation of Interactive Digital History Textbooks with Primary Source Documents

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This research report details phase 1 of an ongoing design based research project. Motivated by the current context of the emerging participatory youth media ecology and national support for digital textbooks in the hands of all students, we set out to determine the feasibility of students creating their own interactive digital textbooks using primary source documents. In collaboration with a history teacher, the research team designed a theory driven curriculum supplement and implemented this with four 10th grade history classes. The process and preliminary findings are presented and discussed.

Today's youth commonly engage with social media, media distribution, and digital media production as part of a new kind of shared culture (Ito, 2009). Engagement in these friendship driven practices and interest driven practices are associated with the development of new forms of media literacy skills and informal peer learning environments (Ito 2009). While teens are coming of age in this new media ecology, their high school history teachers sit on the opposite end of the digital native/digital immigrant spectrum often lacking technological fluency or technological pedagogical content knowledge (TPCK) to introduce technology into the curriculum. Complicating the situation further is the proliferation of digital technologies in U.S. classrooms; since 1991, the number of Internet connected devices available per student in schools has risen steadily (Warschauer, 2010) and the end is not in sight. Most states are gearing up for digital administration of common core aligned tests, a feat that all but requires a nationwide increase in student to device ratio. Furthermore, U.S. Secretary of Education Arne Duncan has set the national goal to have digital textbooks in the hands of all U.S. students within the next five years. So the stage is set: youth computer access and use is higher than ever, access to technology in schools is increasing, and technological skills are integral for those entering the labor force in the next twenty years (Warschauer, 2010). How will the story unfold? Well, if we continue on our current trajectory technology will be "oversold and underused" (Cuban 2001) and as a result curriculum and practice will remain mostly unchanged by this perfect storm. Alternatively, students may continue to experience school-as-usual but with modifications in method of delivery. As current analogue practices are being furiously digitized. In this version of the future, tests and textbooks, worksheets and essays, will be delivered and completed digitally but otherwise remain largely unchanged. A third possible outcome entails students engaging with technology for learning in new, authentic, and innovative ways that simultaneously aid in the development of technological fluency, content specific practices and content knowledge. How will this perfect storm of competing contexts in U.S. unfold in American Education? How might textbooks be used in innovative ways as tools for learning?

The research presented in this report is specifically interested in education's digital future in the high school history class. We consider historical thinking and the ways in which technology can be used in development of this skill. Wineburg (2001) introduces the notion that "Historical thinking, in its deepest forms, is neither a natural process nor something that springs automatically from psychological development". Students in high school history classes are unlikely to develop mature historical thought through instruction that relies on memorization of facts and dates. Despite this, many history teachers emphasize student learning of exhaustive lists of historical facts (Barton & Levstik, 2003). Monologic instruction is characterized by authoritative voice (Bhaktin 1981) and tacitly demands that students accept one true history without actually engaging with the information. In contrast, the development of true historical thinking requires a learner to linger in the ambiguity, navigating an underlying tension between the strangeness of history and its familiarity (Wineburg 2001). Historians achieve a necessary balance between understanding historical moments in their true context (strangeness) and determining their relevance and application to our world (familiarity). This work is characterized by evaluation of evidence, argumentation, and the application of historical knowledge (Beyond the Bubble 2013) and it is often conducted by reasoning alongside primary source documents that represent a multiplicity of perspectives. As such the adoption of document based teaching and learning in the high school history class is germane to the development of historical thinking.

Although many history classrooms engage in document based instruction, there is a gap between the abundant digital resources available though archives, museums, and libraries and the dearth of resources that are readily available in high school history class. Motivated by the current context of educational technology, this research project explores what might happen if we bridged that gap, connecting students to available resources and asking them to engage in the work of historians. Given the rise in digital media production and distribution in youth culture, we explore the feasibility of digital authoring tools as a means to move students beyond uncritical content consumption and build their capacity for historical thinking. This report is a presentation of

the methods and preliminary findings from the first phase an ongoing design based research agenda. This initial phase of the project was motivated by the following research questions. RQ 1) To what extent is it feasible for high school students to craft their own digital interactive history textbooks using primary source documents? RQ 2) To what degree did students engage in the practices of authoring history in crafting their textbook (i.e., sourcing, contextualizing, multiple perspective taking, choosing relevant primary sources)? RQ 3) To what degree did students utilize the affordances of the technology specifically in service of historical thinking? To what degree did students utilize the affordances to share multiple perspectives on historical events?

Conceptual Framework

This study has two key constructs. The first construct of interest in this work is *historical knowledge*. The development of historical knowledge is a by-product of historical thinking. As such, we treat the process of authoring an interactive digital history textbook as a potential act for historical thinking and treat the student created artifacts as a demonstration of historical knowledge. We acknowledge that this a conceptual leap and recognize the underlying assumption that to demonstrate historical knowledge one must engage in some degree of historical thinking. As this was a preliminary study in an ongoing project, we chose to focus on the feasibility of the medium for the presentation of historical knowledge and planned for phase 2 to collect data more explicitly tied to historical thinking. We draw on 3 main components from the framework of van Drie and van Boxtel (2004) in our operationalization of historical knowledge, and as such conceptualize historical knowledge with regards to use of historical questions, use of primary sources, and contextualization. Additionally, we consider multiple perspective taking, to be a specifically relevant in this research given potential of the medium for displaying a multiplicity of historical voices. Multiple perspective taking is the presentation and exploration of different ways of thinking about moments in history as they were thought of at the time and is demonstrated through a combination of sourcing and contextualizing. Future research will examine the remaining components of the van Drie and van Boxtel (2004) framework: argumentation, use of substantive concepts, and use of metaconcepts. The second construct of interest is the *affordances of technology*. We operationalize this explicitly in connection with the iBooks author, the tool chosen for digital authoring. Each of the interactive widgets afforded by iBooks author is has a unique set of affordances that can be utilized during authorship. We seek to answer our research questions by taking up these constructs first separately and then together through examination of specific affordances of the technology as the co-occur with demonstration of historical knowledge.

Research Design

At the onset of the project, we set out to utilize design based research methods to find out if it was feasible for high school students to craft their own digital interactive history textbooks using primary source documents. In the early stages of the project, the research team engaged in the selection, purchase, organization, and deployment of the hardware and software identified as having the greatest potential value for history learning with primary sources. Concurrently, we conceptualized and created a two-week curriculum supplement integrating best practices in history instruction grounded in existing scholarship. After selecting a site for implementation, we began a partnership with the teacher chosen to collaborate in the study. We conducted multiple observations of his history class and documented via field notes and memos. We worked with the teacher to identify the most conducive conditions for students' collaborative construction of multimodal interactive digital history textbook chapters. We identified alignment between affordances of our chosen digital authoring software (such as callouts, galleries, interactive quizzes, and 3D models) and use cases for sharing multiple perspectives and designed curricular components intended to support the students and teacher in exploring and exploiting these tools specifically for the purposes of authoring history with a thick narrative. One strategy for this included the design and deployment of templates to scaffold student groups in the task of authoring a historical narrative that integrates multiple perspectives, with each perspective introduced via one or more primary source documents. Another tool developed to support students in this task was a model or exemplar chapter. Support tools and curriculum were refined over multiple iterations.

To address the gap in availability of digital resources, the research team liaised between the collaborating history teacher in our study and a local archive. This resulted in a visit by the archivist to each of the four tenth-grade classes. A university student (with expertise in this area) conducted a follow-up lesson covering important considerations for working with primary source materials. Finally, the research team compiled a well-curated database of primary source documents that was organized to meet the needs of the learning environment (as identified in multiple interviews and correspondences with four tenth-grade history teachers). These resources were introduced as part of our curriculum.

95 10th grade students from a northern California charter school participated in a 14-day our curricular intervention. 3 members of the research team and the collaborating teacher implemented the curriculum supplement. During the intervention, the research team collected a plethora of data (over 3 terabytes) including but not limited video files of each lesson, audio files of students working in small groups, screen capture and

keystroke data captured as students worked on computers, field notes, research memos, student surveys, summative transfer task, and the final artifacts. Findings in this research report were generated via a content analysis using the student created digital history textbook chapters as the message source. Concurrent analyses of a transfer task, multiple student surveys, and in depth qualitative look at a subset of textbook chapters are in progress and the results of all will be used to inform the next iteration and implementation of our curriculum supplement.

Preliminary Findings

History as Usual: Pre-Implementation Observations

A comparison of field notes from observations during the normal history class to field notes taken during project implementation indicate that our intervention allowed for a higher frequency of technology use, content creation and creativity. During five observations of the normal history class the only use of technology observed was laptop and projector use by the teacher. Content creation by students observed prior to the intervention consisted primarily of completion of lecture-aligned worksheets. While we did not observe specific instances of creativity during these observations, student work hung on the walls indicates this to be an occasional part of the normal history class. Student generated maps; propaganda posters and research projects were prominent in the classroom. Finally, pre-observations revealed an aspect of classroom culture related to communication. Students frequently engaged in turn and talk activities and we observed a consistently high on task dialogue and rate of participation in whole group discussion.

History Recast: Digital Media Production

One unexpected outcome of our implementation was the adoption of our curated database of standards aligned primary source documents. Even before we began the intervention, we received requests for access from other members of the history department. This was followed by requests by other teachers in the later school network.

Figure 1 presents a summary of the formal characteristics of the interactive digital textbook chapters authored by the students who participated in our intervention. The students were extremely generative during the two-week implementation writing nearly 14,000 words distributed across 73 chapters. During class wide project debriefs held after implementation, students lamented the time constraints that limited further productivity. They also expressed what we perceive to be a high degree of enthusiasm and engagement both throughout the intervention and during the final debrief.

Figure 1: Summary of student-generated content during phase 1 implementation

Group	# Students	# Groups	Words	Paragraph	Media (video)	Media (images)	Pages	Chapters	Words/Chapter	Chapters/Group
Class 1	25	13	5759	68	0	35	115	20	288	1.5
Class 2	26	12	4645	119	0	37	109	14	332	1.2
Class 3	25	13	1675	85	3	52	133	24	70	1.8
Class 4	22	11	1804	70	2	36	83	16	113	1.5
Total	98	49	13883	342	5	157	433	73	190	1.5

Our content analysis of student artifacts includes coding for 15 different instantiations of historical knowledge and 16 variables related to technological affordances. Currently the research team is in the process of coder training in order to establish inter-rater reliability for each of the 31 variables in our theory driven codebook. A complete recoding of the data set by multiple coders is scheduled to follow. As such, the subset of findings presented below is centered on trends identified by the authors related to the perspective taking variable. Specific counts and relative frequencies have been temporarily omitted (pending the establishment and calculation of group coding reliabilities) but will be included upon presentation of the paper.

RQ 1) To what extent is it feasible for high school students to craft their own digital interactive history textbooks using primary source documents? Having completed phase 1 of this work in four high school classes it is determined that it is definitely feasible for students to create interactive digital history texts utilizing primary source documents.

RQ 2) *To what degree did students engage in the practices of authoring history (and therefore historical thinking) in crafting their textbook (i.e., sourcing, contextualizing, multiple perspective taking, choosing relevant primary sources)?* Preliminary coding of student created artifacts indicated that students' demonstration of historical knowledge varied widely within the sample. This was less so for the key variable of interest- perspective taking. A vast majority of the digital textbook chapters limited their portrayal of historical events to two perspectives. Furthermore, while presentation of two voices is technically multiple perspective taking, it is the most shallow form. Presentation of two perspectives is not in itself necessarily lacking depth, thus we describe artifacts as shallow when they mirror the traditional monologic treatment of history that is common in high school history textbooks. Shallow artifacts authoritatively present typical binary classifications of historical events (pro ally vs pro enemy). This was at the expense of a more dialogic approach to construction of deep historical knowledge through exploring a multiplicity of voices and/or a introducing the notion of who is left out of their analyses. Although this deep historical thinking was the primary design goal of the researchers for this preliminary study, a very small subset of the sample achieved this goal. One possible explanation for this is insufficient instruction related to this skill or insufficient time for skill development. The students had been introduced to the concept of perspective taking prior several times during the year prior to implementation of our study but these instances were demonstrated by the teacher rather than opportunities to do so themselves. Another possible explanation for this is a misalignment between the goal of the researchers and the evaluation of the student work by the teacher. During whole post project debriefs, students from two of the four classes independently reported a tension between their eagerness to use the tools to present a multiplicity of historical voices and am urge to focus on what they were being graded on. Grades were assigned based on the presentation of two perspectives. Each of these interpretations has considerable implications for the next iteration and implementation of our intervention.

RQ 3) *To what degree did students utilize the affordances of the technology specifically in service of historical thinking?* To what degree did students utilize the affordances to share multiple perspectives on historical events? Instances of multiple perspective taking co-occurred with affordances of the software in a majority of the student artifacts. Provision of templates, models and coaching supported students' use of interactive widgets as resources for displaying multiple perspectives. This was evidenced by the fact that student authors only occasionally demonstrated multiple perspectives in forms that varied from one of the numerous templates provided. This raises the question of whether the templates were a factor limiting the innovative use of the affordances in demonstration of historical knowledge. Prior to our next implementation, we intend to develop some insights as to whether this was the case through a comprehensive interrogation of our data and analysis of interactions between the variables from each of our constructs.

Summary

We set out to investigate the feasibility and outcomes of digital textbook authorship by high school students. Preliminary findings from phase 1 implementation indicate that while feasible, the intervention requires considerable redesign prior to phase 2. While this is true, our rich multimedia data set of student generated content using primary and secondary sources when taken in conjunction with anecdotal evidence of the enthusiasm of the students, teacher, and extended school network provide a warrant for the continuation of our research. It is noteworthy although not unexpected that small contextual factors have huge implications for the utility and uptake of technological affordances for document based historical thinking and demonstration of historical knowledge. Some of the major contextual factors shaping these outcomes include time to complete task, establishing and setting norms for technology mediated learning, modeling desired outcomes with exemplars, and use of templates designed to promote interrogation of a multiplicity of historical voices. Finally, alignment between tools, tasks, and how the students are being evaluated is essential for success in the adoption of digital authoring tools as means to support document based reasoning. Our next phase of analysis has promise for contributing to theory and scholarship regarding the ways in which specific technological affordances support and/or limit specific aspects of the construction and demonstration of historical knowledge. This information has potential for informing history teaching practice and technology design for history learning.

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