

Web 2.0 Tools and the Evolving Pedagogy of Teacher Education

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Abstract

Teacher educators are constantly revisiting and revising their teacher education programs. Historically, research, educational policy, and accreditation requirements have been the impetus for renewal in teacher education. For the past 20 years, technology innovation has played an increasingly significant role in rethinking teacher education. This paper discusses recent changes in a social studies teacher education program and the role Web 2.0 tools played in helping to rethink pedagogy.

Teacher educators are in a constant state of revisiting and revising their teacher education programs. Historically, research, educational policy, and accreditation requirements have been the impetus for renewal in teacher education. For the past 20 years, technology innovation has played an increasingly significant role in rethinking teacher education. This article outlines recent changes in a social studies teacher education program and the role Web 2.0 tools played in developing meaningful activities centered on the development of sound technological pedagogical content knowledge (TPCK). This paper describes the experience of 18 preservice social studies teachers over the course of one semester, using Web 2.0 tools to design and implement a digital flexbook.

Technology Integration in a Preservice Methods Class

Preparing teachers to use technology effectively in the classroom is a central issue the field of education faces in the 21st century (Bolick, Berson, Coutts, & Heinecke, 2003). Preservice teachers must be proficient in using technology for their productivity (e.g., taking attendance, presenting content) but also prepared to integrate technology effectively into instruction. Often, however, the integration of technology into preservice teacher education programs is the exception rather than the norm (Cantu, 2000). As a result, preservice teachers often graduate with limited knowledge of how to integrate technology effectively into the classroom curriculum (Cantu, 2000).

In terms of social studies, if preservice educators are to develop instructional social studies strategies that move beyond traditional approaches, it is imperative that teacher candidates have opportunities to engage in pedagogy that uses and integrates technology in a constructivist manner (Ehman, 2001). Preservice social studies teachers need to see technology effectively modeled and have meaningful opportunities to use technology if they are going to integrate technology into their future social studies teaching (Bates, 2008; Diem, 2002). Therefore, teacher educators must effectively engage and model appropriate strategies for technology integration (Bolick et al., 2003).

One way to achieve this goal is to use Web 2.0 tools in the design and construction of a digital flexbook. The creation of a digital flexbook can provide a more inclusive and customizable approach to content construction than other traditional pedagogical devices.

Digital Flexbooks

In spring 2009, California governor Arnold Schwarzenegger announced plans for the state to begin developing digital *flexbooks* for high school classes that would be available to public schools across the state (Paul, 2009). The term flexbook refers to the free, nonlinear, highly customizable and easy-to-use nature of open source textbooks (Fletcher, 2010). The main motivation for the digital flexbook initiative was to help pull California out of its current economic crisis. The Governor said the state could save \$400 million if its 2 million high school students used digital flexbooks instead of traditional print textbooks (Kingsbury & Galloway, 2006). Schwarzenegger also touted other educational benefits of the initiative, such as increased collaboration among school districts, interactive classrooms, increased teacher creativity, and reduced health concerns for students who on a typical school day carry 30% or more of their body weight in paper textbooks (Golshani, 2008; Surdin, 2009).

Proponents of digital flexbooks argued that much of the cost going into traditional textbooks is wrapped up in hidden instructional costs, such as the instructional time wasted on collecting and maintaining books, students not doing work because they forgot their books, and districts having to spend thousands of dollars to store old books (Salpeter, 2009). The potential cost savings is significant and a major reason digital flexbooks are beginning to eat into the \$6 billion a year business of paper textbook adoption.

Obvious barriers to a digital flexbook initiative exist, such as finding the money and time for professional development with teachers, student access to technology at home, and slow-moving school and state bureaucracies. Yet, in spite of these barriers some states and school districts are beginning to implement digital content in significant ways (Fletcher, 2010). Since California announced its digital initiative plans, the states of Indiana, Florida, Virginia, and Texas have considered legislation that allows districts the flexibility to spend funds previously earmarked for textbooks on digital content (Salpeter, 2009).

Although publishers of traditional textbooks have carted out “digital textbooks,” which are really just paper textbooks in digital format, proponents of digital flexbooks hail the ability of districts and teachers to customize content that more accurately reflects their community, their students, and their learning objectives (Young, 2009). Indeed, one of the distinct advantages of using digital content instead of traditional textbooks is the ability for users to update, edit, and expand the digital content at any given moment based on real-world events.

In addition, a digital flexbook can provide a community of users collaborative space to construct knowledge in new and different ways. Digital textbooks that publishers have created, on the other hand, restrict content creation to a small number of scholars and editors. In this way, digital textbooks often reproduce traditional teacher-textbook-centered pedagogy while digital flexbooks facilitate student-centered teaching and learning.

Finally, a digital flexbook provides users with an easy-to-use platform for embedding and uploading multimedia components such as [YouTube](#) videos, student created media, flash games, and image galleries. Thus, the development of a digital flexbook embedded in social studies can engage preservice teachers in the construction and interpretation of history through the exploration and critique of primary and secondary sources. (**Editor's Note:** Website URLs can be found in the [Resources](#) section at the end of this article.)

Theoretical Perspectives

While scholars have not agreed on a singular definition of Web 2.0, Tim O'Reilly (2005) posited that Web 2.0 technology can be seen as "an ongoing transition of the World Wide Web from a collection of static websites to a full-fledged computing platform serving Web applications to end users" (para. 2). Applications that have been termed Web 2.0 applications include video sharing sites, wikis, blogs, podcasts, and social networking sites like Twitter (Richardson, 2006a). Taken together, Web 2.0 applications are radically changing the way users create, share, collaborate and publish content through the Internet (Richardson, 2006b).

One of the great benefits of Web 2.0, or the Read/Write Web, is that users can work together to construct a knowledge base without having to work in the complicated language of HTML code (Heafner & Friedman, 2008; McLeod & Vasinda, 2008). For much of the past 20 years, technology integration in education, specifically web-based materials, has been beholden to those with the knowledge and skills to use HTML code (McLeod & Vasinda, 2008). Through the easy-to-use "what you see is what you get" (WYSIWG) interface, Web 2.0 tools have opened the door for a variety of students in various contexts to create knowledge in visual, aural, spatial, and textual forms.

Web 2.0 also fosters agency and democratic participation with students. Students do not have to be passive recipients of information but can become equal partners in the learning process as they collaborate and create knowledge in a social manner (Heafner & Friedman, 2008). Simply put, when Web 2.0 tools are effectively integrated into the classroom, student-centered pedagogy becomes the norm. Thus, Web 2.0 applications, specifically the creation of a digital flexbook using wiki technology, promotes collaboration and higher order thinking skills as preservice teachers construct knowledge for themselves, shifting the focus away from teacher-centered pedagogy.

Additionally, the collaborative nature of Web 2.0 forces preservice teachers to take into account multiple perspectives (Bull, Hammond, & Ferster, 2008). This type of pedagogy is reinforced by the National Council for the Social Studies (2006), which emphasized

engaging perspectives from various aspects of history while, helping students 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 US and other societies. (p. 1)

The focus on habits of mind helps students to develop the ability to pose pertinent questions and to support conclusions and abstract thought across the entire spectrum of social sciences (Lee & Friedman, 2009).

Finally, the democratization of contributors that is hoped for by Web 2.0 supporters comes with an urgent need for educational leaders to prepare preservice teachers to be able to examine critically the information they have access to (McLeod & Vasinda, 2008). To do this, educators must realize that moving students from consumers of information to editors of information is extremely important (Bull et al., 2008).

The use of Web 2.0 tools can be a powerful way to help preservice teachers develop a critical understanding of history and their teaching through the critique and creation of new knowledge. As a result, the creation of a digital flexbook could be an important step in actively engaging preservice teachers in the process of doing history while building the necessary skills for the development of TPACK.

Technological Pedagogical Content Knowledge

On its own, technology does not produce intellectual engagement. Through the effective integration of a teacher's TPACK students can be purposefully guided through the "regimen of techniques for evidentiary inquiry and assisted in the development of new methodological schema for inter-textual and recursive historical study" (Swan & Hicks, 2007, p. 144). Building on Shulman's (1986) conception of pedagogical content knowledge, Mishra and Koehler (2006) defined TPACK as "an emergent form of knowledge that goes beyond all three components: content, pedagogy, and technology" to consider all three issues within a "state of dynamic equilibrium" (p. 1029). Cox (2008) went a bit further when she defined TPACK as the

knowledge of the dynamic, transactional negotiation among technology, pedagogy, and content and how that negotiation impacts student learning in a classroom context. The essential features are (a) the use of appropriate technology (b) in a particular content area (c) as part of a pedagogical strategy (d) within a given educational context (e) to develop students' knowledge of a particular topic or meet an educational objective or student need. (p. 40)

In short, preservice experiences should be infused with technology, pedagogy, and content in order to develop a nuanced understanding of the complex relationships between technology, content, and pedagogy for future social studies teaching (Mishra & Koehler, 2006). The process of using technology in meaningful ways through the design of a digital flexbook using wiki technology can provide a basis for building preservice teachers' TPACK.

Wiki Technology

A wiki is a Web 2.0 application that can be defined as a collaborative Web space where users can add and edit content to be published on the Internet. (Depending on the wiki hosting site, *users* could mean anyone registered, or invited or the public at large.) Heafner and Friedman's (2008) study on the use of wikis demonstrated a pedagogical shift from traditional teacher-centered instructional approaches to student-oriented, constructivist learning, which resulted in increased student self-efficacy and motivation (p. 288). The data from their study attests to the potential long-term benefits of using wikis for student learning (p. 289). In line with the literature on Web 2.0, the use of wikis in the classroom has the potential to allow students to develop their own understandings

and, thus, become generators of knowledge and active contributors to the Internet. In other words, preservice teachers become guided travelers rather than passive learners (Demski, 2009).

In addition, the creation of a digital flexbook using wiki technologies “requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy and content,” building a basis for the development of TPCK in future teaching (Mishra & Koehler, 2006, p. 1029).

Although numerous wiki-hosting sites can be used to house this type of collaborative student-centered approach, the instructors for this course decided to use [PBworks](#). PBworks became the logical choice because it is free to use, void of commercial advertising, is largely customizable, provides a complete history and audit trail for all work related to a user’s particular site, and allows administrators to control the access of other users and third party readers[a]. The open source site also maintains a 2GB storage capacity and allows for up to 100 users. In addition, the easy-to-use WYSIWG interface allows for efficient image and video uploads, as well as the ability to embed [Jing](#) tutorials easily for students to refer to as they work.

Application in a Social Studies Methods Class

Programmatic Context. EDUC 415, Culture Society and Teaching, is a required course in our elementary education program at the University of North Carolina at Chapel Hill. The course was designed to teach both foundations and elementary social studies methods. Given that foundations and social studies methods are paired in this course, our presentation of methods is through a social justice lens. The course is taught in a school two mornings a week. Each morning, the students spend approximately 2 hours working in an elementary classroom and 2 hours in class.

Assignment Goals. The development of a class digital flexbook was born from three primary goals (see class wiki at <http://unceduc415.pbworks.com/>).

The initial goal of the digital flexbook project was to provide students with an opportunity to interact meaningfully with technology, content, and pedagogy (see Mishra & Koehler, 2006) in an integrated way. In other words, we wanted to construct a meaningful opportunity for students to develop and build their TPCK. This project was the perfect opportunity to accomplish this goal. Working in pairs, students would have to work within the social studies curriculum in order to critique a social studies textbook, identify a topic in North Carolina history, collect historical documents, and design a digital chapter using PBworks. The term *chapter* is used loosely here. The term chapter often elicits notions of linear, structured historical accounts. Each chapter in the class digital flexbook, however, can be navigated by the reader in a nonlinear fashion. The digital flexbook is composed of nine historical chapters based on topics chosen by the preservice educators.

Embedded in the digital flexbook project is the belief that a constructivist pedagogy can engage students in developing historical inquiry skills and “habits of mind” through “reconciling incomplete and conflicting accounts of the past with primary and secondary sources” (Stoddard, Hofer, & Buchanan, 2008, p. 145). This type of approach requires students to move beyond the basic facts of the textbook in order to understand the context of historical people and events.

As the students began to collect their materials, they were asked to think of ways in which wiki technology could provide space to enhance, challenge, and expand the curriculum. Using hypertext, uploading video (e.g., see [“Railroads and Technology” chapter](#)), creating avatars (e.g., see [“Colonial Era” chapter](#)), and embedding flash content are all ways in which PBworks allows for students to depart from traditional text-based historical accounts. Finally, each pair of preservice teachers produced two lesson plans to accompany the chapter to be used by the practicum teachers and students. The lessons were expected to incorporate both the content and the use of the digital flexbook with elementary school students. By weaving together the analysis and creation of social studies content, wiki technology, and the development of lesson plans, students were provided a meaningful opportunity to develop TPCK.

The second essential project goal was the embedding of the digital flexbook in local history. One of the best approaches to learning about and organizing the past is through the study of local history (Clarke & Lee, 2004). The privileging of local history is meant to foster preservice educators' thinking about the ways in which the local community is interrelated to state and national politics. Specifically, the centering of local history in this project allowed us as professors to demonstrate ways in which preservice teachers could connect the social studies curriculum to their future students' lives, therefore, fostering engagement and critical thinking skills (McIntyre, Rosebery, & Gonzalez, 2001). Finally, the study of local history enables preservice teachers to contextualize their historical thinking within the histories and lived realities of the communities in which they will be employed.

Finally, we wanted to expose students to ways in which many written accounts of history exclude or marginalize certain groups of people. Students were asked to critique the writing of history for the ways in which the implicit cultural assumptions, frames of reference, perspectives, and biases influence the construction of social studies knowledge within a textbook account (Banks, 1993). The textbook provides fertile ground for critiquing and challenging the past, because it is beholden to economies of scale and most often ends up expressing the official knowledge of the dominant group (Apple, 1999).

By grounding the digital flexbook in the economies of the social studies textbook, we were asking students to reconcile historical accounts through an examination of the subtle ways in which the textbook industry privileges certain voices to the exclusion of others. Therefore, the topics that our students chose reflect much more than a historical problem but rather represent an attempt to explore, challenge, and interpret historical narratives in more inclusive and expansive ways. A great example of this type of work can be seen in the digital flexbook chapter entitled [“The Wilmington Railroad.”](#)

Overview of the Process

Students worked in pairs over the course of one semester to develop nine social studies infused modules. The nine modules were designed to be nonlinear and navigated at the readers' choosing. The students were challenged to include oral histories, primary sources, media texts, and other primary and secondary accounts of a historical era and events to provide a more inclusive, personal, and critical lens for studying the social studies in North Carolina. Students were also encouraged to use hypertext to expand their historical accounts by linking to multimedia sites, academic journals, games, and other forms of digital content. Through the use of hypertext, students potentially are better able to represent the messiness of history (Ayers, 1999).

Benchmarks were given throughout the semester to break the project into manageable parts and to provide feedback in terms of the direction and content of the modules. To

help students critique a social studies textbook and to organize historical materials into chapters, instructors introduced the acronym SPRITE. The SPRITE acronym can be a tool for document analysis, essay writing, and in this case, content organization. The SPRITE framework is also a useful tool for helping students to better understand the nature of historical work and the interconnected nature of the social studies. Students were, therefore, asked to address four of these historical factors to ensure a more complex and interconnected account. The use of the SPRITE framework to construct a historical account can be most clearly seen in the flexbook chapter entitled, "[Native Americans in North Carolina](#)."

The core components of the flexbook chapters consist of (a) an overarching question based on 9 to 11 primary and secondary sources, (b) a rationale for why the topic was important and how it added to or challenged the textbook account, (c) an index of materials located within the chapter, (d) a comprehensive account of the historical topic to be analyzed using the SPRITE framework, and (e) a teacher and student resource page. Topics developed include [the Wilmington Rail Road](#), [Children of the American Revolution](#), the [Civil Rights Era](#), [North Carolina's Involvement in the Civil War](#), the [Colonial Era](#), [Anti-War Protests](#), [Family Life During World War II](#), [Native Americans in Eastern North Carolina](#), and [the Jazz Age in North Carolina](#).

Finally, students were required to keep a semester-long virtual journal using [Voicethread](#). Voicethread is a free Web 2.0 application for teachers and can be used for virtual journals, digital storytelling, oral history, and language acquisition among other pedagogical activities. Students were expected to post historical documents, artifacts, questions, and other materials that directly related to their experience working with Web 2.0 technologies, analyzed the social studies curriculum for a social justice perspective, and developed curriculum for their chapter. Instructors left comments, answered technical questions, and provided feedback using the comment function of voicethread.com. As a result, the teachers and students were engaged in a semester-long dynamic discussion about the digital flexbook project.

Five Phases of Development

As the project developed, it became apparent that the creation of the class digital flexbook operated along five distinct phases: awareness, analysis, collection, design, and reflection. Each of these phases was unique to the process but did not occur in isolation. At times students gained awareness even as they were putting the final touches on their chapters. Often, the collection of primary and secondary sources led to new discussions and connections that needed further analysis. However, these five phases provide a lens to situate the development of the digital flexbook project from its inception through its development.

Awareness. The initial stage of the project can be defined as the awareness stage. This stage was crucial to providing a basis for further critique and examination of materials later in the semester. The awareness phase was predicated on the belief that "to understand their future students, prospective teachers must first examine their own socio-cultural identities" (Villegas & Lucas, 2002, p. 22). Students were led through readings, class discussions, and activities such as a mock trial of Christopher Columbus that began to open up dialog on the ways in which race, gender, language, and social class play into the writing of history and the socially constructed nature of teaching and learning. As Villegas and Lucas (2002) argued, "Without this insight, teachers are unable to cross the socio-cultural boundaries that separate too many of them from their students" (p. 22).

Analysis. The analysis phase was a four-part process in which students were asked to interview a current elementary school student, critique a [Harcourt Horizons](#) fourth-grade social studies textbook using a multicultural lens, analyze the materials found in the media resource library of the practicum school, and examine the school website for additional materials. We chose to use the fourth-grade textbook because it is centered on North Carolina history, provides a universal curriculum that can be modified for K-5, and would provide a unifying theme to the digital flexbook. Students who were not teaching fourth grade were expected to use the fourth-grade social studies textbook as starting place for their topic and then modify their flexbook chapter based on the practicum classroom they were working in over the course of the semester.

By interviewing a current elementary school student the preservice teachers were explicitly guided to understand the ways in which K-5 students might understand the nature of history and connect with their local community (see [“History Through a Child's Eye”](#)).

For the textbook critique, students were given an evaluation rubric that scored the textbook on a 20-point scale using prompts such as the following:

- Are a myriad of cultures being represented?
- Do images represent individuals from multiple cultural backgrounds?
- Do images represent individuals from both genders in equal roles of power and authority?
- Does the scholarship encourage cultural appreciation?
- Does the content address the North Carolina State Standards?
- Does the textbook provide contextualized, authentic, and real world” examples of various groups?

After reviewing a textbook account of their historical topic, students were asked to catalog and critique resources found within the school media resource library. In cataloging the media center resources, students were asked to determine the types of materials that were available and ways in which the materials either reinforced the textbook account of their topic or provided an alternative narrative. Last, students had class time to search the school website and associated hyperlinks for additional materials on the topic. We particularly wanted students to examine how easy the sites were to access, for whom the sites were designed, and how the historical materials found could either reinforce or omit certain voices. After each of the above critiques, students used class time to reflect on findings, relate findings to class readings, and ask questions. The preservice teachers were also expected to reflect in a more individual setting using [Voicethread](#).

Collection. The core component of the digital flexbook was the content students selected for their wiki space. After choosing a historical topic, critiquing the textbook, evaluating the media resource center, and examining school webpages, preservice teachers gathered 9 to 11 primary and secondary sources to facilitate the construction of an historical account (see [“Education Continued”](#)). In particular, students sought to include a variety of primary and secondary sources such as oral histories, media texts (e.g., see [“The Jazz Age”](#)), political texts (e.g., see [“Employment”](#)), and images (e.g., see [“Protesting in the 21st Century”](#)).

We quickly realized that this stage of the process was going to be challenging. Most of our students had not engaged with primary sources before this class. The vast majority of our students were unsure of how to begin collecting primary and secondary sources. Almost none of the preservice teachers had ever entered the University archives or navigated the

[Carolina Digital Library and Archives](#) prior to this project. Both are excellent resources for historical materials, but we quickly realized that the students were generally unprepared to collect documents to begin developing their digital flexbook chapter.

Taking a step back, we held a “museum” day in which tables were set up for students to engage with historical materials. The instructors used materials borrowed from the university archives and libraries to represent different time periods and types of historical sources. Students were given 15 minutes at each table to read, touch, and interpret the materials. We chose this particular activity to encourage the preservice teachers in thinking about the types of materials they might want to include in their flexbook chapter. In particular, we wanted students to understand the nature of historical sources and the ways in which those sources can dictate the story a historian can and will tell.

Design. The design phase of the flexbook project was the least challenging in many ways. Many of our students, if not all, can be considered digital natives (Prensky, 2001), and thus, the process of navigating the wiki site, embedding media, and finding new web 2.0 applications to include was not as difficult as collecting primary and secondary sources. Many of the students incorporated technologies that we had not required or had not heard of, such as the use of a [Voki](#) to make their content more interactive. Other groups embedded [Prezi](#) presentations (e.g., see “[John Coltrane](#)”) to make their content more dynamic and offer students more nonlinear opportunities to navigate the material.

The hardest part of this phase for students was determining the way in which the technology of the wiki could be used to best represent the historical materials and, thus, the account they were constructing. This was the point in which their content knowledge, pedagogical beliefs, and technological skills merged. They had to make choices for the first time in their teaching careers about content, pedagogy, and the use of technology.

Reflection. As part of this project and in keeping with the literature on multicultural classrooms, students were required to maintain a virtual journal using Voicethread for the entire semester. Using artifacts for their digital flexbook chapter, personal reflections, experience in their practicum that highlighted a point in our class, or a historical document they came across, the virtual journals became a semester-long dialog between the instructors and the students on the nature of history, the complex nature of writing textbooks, and their shifting and evolving position. Students were also asked to write a reflection at the end of the semester on BlackBoard that outlined their experience in developing the class digital flexbook.

Challenges

Although the implications for learning were immense and important, we faced numerous challenges in developing a digital flexbook. The most interesting aspect of this project was the frustration that grew out the student’s lack of content knowledge. Discovering primary and secondary sources, challenging the textbooks, and creating new knowledge were limited by the preservice teachers’ lack of historical information and content knowledge. This situation was compounded by the fact that much of what they knew was wrong or inaccurate.

As this experience was their first at developing a digital flexbook, and because the activity was truly situated within a constructivist framework, we had limited knowledge of what the students should and would create. Much of what they created went beyond our expectations. However, through the course of the semester the socially constructed

nature of being a student led some to worry constantly about their grades rather than explore the process of doing history.

Finally, the greatest threat we face in implementing this type of project in the future is the marginalization of the social studies in elementary grades. When presented with the completed digital flexbook, many teachers were appreciative but unsure of when or how they could integrate a social studies model into their class time due to the focus on standardized tests in the local systems and, in some cases, a move to scripted curriculum.

Conclusion

The digital flexbook project was centered on and around inquiry-based activities that help students understand historical processes and engage their own histories into a broader understanding. Based on student feedback, we found that the digital flexbook assignment was an important and valued component to the development of preservice teachers' TPCK. We are currently in beginning stages of planning our course for next semester and plan to continue this project. However, we would like to expand the activity to consider the ways in which the elementary students can become active partners in the doing of local history, much like the work that has been done on the [Digital Durham](#) project conducted through Duke University (Abel, 2009). It would be extremely valuable for our preservice teachers to work with elementary students in creating new knowledge and gain a better understanding of the ways in which elementary students understand and perceive the social studies.

Despite the success of the project, we still have many questions that might frame future research projects. We intend to study our students' integration of the digital flexbook project into their own teaching. As we develop our research, we are interested in studying the ways in which digital flexbooks are being implemented into the social studies and the impact they have on student learning. In particular, we wonder if there is a difference in student learning with digital flexbooks over traditional paper-based textbooks. We also question what impact the digital flexbook project may have on the preservice teachers' TPCK.

Through the five phases outlined in this paper, the students completed the course with a better understanding of the types of pedagogical praxis that are frequently privileged in the classroom, developed a more critical stance on the intersection of race, gender, and socio-economic status on the writing of history, and integrated a model for how technology can and should be used in the classroom.

Notes

[a] Premium workspaces for PBworks start at \$99/year. The premium account expands storage to 40GB and unlocks all security features for administrators to use. The free educator account contained enough memory and security features for all of my classroom needs.

Author's Note: The flexbook chapters are actual student products and thus, vary in degree of quality. However, each chapter represents the attempt to integrate technology, content knowledge and pedagogy through the creation of a digital flexbook centered around North Carolina history. In addition, the navigation bar to the right of the pbworks wiki page will move the reader through the various flexbook chapters.

References

- Abel, T. (2009). The digital durham project: creating community through history, technology, and service learning. *Perspectives on History, May*. Retrieved from <http://www.historians.org/perspectives/issues/2009/0905/0905for12.cfm>
- Apple, M. W. (1999). *Power, meaning, and identity: Essays in critical educational studies*. New York, NY: P. Lang.
- Ayers, E. (1999). *History in hypertext*. Retrieved from <http://jefferson.village.virginia.edu/vcdh/Ayers.OAH.html>
- Banks, J. A. (1993). Multicultural education: Development, dimensions, and challenges. *Phi Delta Kappan, 75(1)*, 22-28.
- Bates, A. (2008). Learning to design webQuests: An exploration in preservice social studies education. *Journal of Social Studies Research, 32(1)*, 10-21.
- Bolick, C., Berson, M., Coutts, C., & Heinecke, W. (2003). Technology applications in social studies teacher education: A survey of social studies methods faculty. *Contemporary Issues in Technology and Teacher Education, 3(3)*, 300-309. Retrieved from <http://www.citejournal.org/vol3/iss3/socialstudies/article1.cfm>
- Bull, G., Hammond, T., & Ferster, B. (2008). Developing Web 2.0 tools for support of historical inquiry in social studies. *Computers in the Schools, 25(3/4)*, 275-287.
- Cantu, D. A. (2000). Technology integration in preservice history teacher education. *Journal of the Association for History and Computing, 3(2)*, 1-19.
- Clarke, W. G., & Lee, J. K. (2004). The promise of digital history in the teaching of local history. *Clearing House, 78(2)*, 84.
- Cox, S. M. (2008). *A conceptual analysis of technological pedagogical content knowledge*. Doctoral dissertation, Brigham Young University, Provo, UT.
- Demski, J. (2009). Free at last. *T.H.E. Journal, 36(6)*, 39-44.
- Diem, R. A. (2002). *An examination of the effects of technology instruction in social studies methods classes*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Ehman, L. H. (2001). Using stand-alone Web modules to integrate technology into secondary social studies methods instruction. *Journal of Research on Technology in Education, 34(1)*, 13.
- Fletcher, G. H. (2010). A revolution on hold. *Transforming Education Through Technology*. Retrieved from <http://thejournal.com/articles/2010/06/01/a-revolution-on-hold.aspx>
- Golshani, F. (2008). Digital textbooks. *IEEE Multimedia, 15(2)*, C2-1.

Heafner, T., & Friedman, A. (2008). Wikis and constructivism in secondary social studies: Fostering a deeper understanding. *Computers in the Schools, 25*(3/4), 288-302.

Kingsbury, A., & Galloway, L. (2006). Textbooks in the digital age. *U.S. News & World Report, 141*(14), 63.

Lee, J., & Friedman, A. M. (2009). *Research on technology in social studies education*. Charlotte, NC: Information Age Pub.

McIntyre, E., Rosebery, A. S., & Gonzalez, N. (2001). *Classroom diversity: Connecting curriculum to students' lives*. Portsmouth, NH: Heinemann.

McLeod, J., & Vasinda, S. (2008). Critical literacy and Web 2.0: Exercising and negotiating power. *Computers in the Schools, 25*(3-4), 259-274.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

National Council for the Social Studies. (2006). *Curriculum standards for social studies: Chapter 2—The themes of social studies*. Retrieved from <http://www.socialstudies.org/standards/strands/>

O'Reilly, T. (2005). *What is Web 2.0?* Retrieved from <http://oreilly.com/web2/archive/what-is-web-20.html>

Paul, R. (2009). California open source digital textbook plan faces barriers. Retrieved from the ARS Technica website: <http://arstechnica.com/open-source/news/2009/05/california-launches-open-source-digital-textbook-initiative.ars>

Prensky, M. (2001). Digital natives, digital immigrants: Part 1. *On The Horizon 9*(5), 1-6.

Richardson, W. (2006a). *Blogs, wikis, podcasts, and other powerful Web tools for classrooms*. Thousand Oaks, CA: Corwin Press.

Richardson, W. (2006b). Learning in the digital age: The educator's guide to the read/write Web. *Educational Leadership, 63*(4), 24.

Salpeter, J. (2009). Textbook deathwatch: The question it seems is no longer "if?" but "when?" *Technology & Learning, 30*(1), 26.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.

Stoddard, J. D., Hofer, M. J., & Buchanan, M. G. (2008). The "starving time" wikinquiry: Using a wiki to foster historical inquiry. *Social Education, 72*(3), 144(146).

Surdin, A. (2009). In some classrooms, books are a thing of the past. *The Washington Post*, p. 3.

Swan, K., & Hicks, D. (2007). Through the democratic lens: The role of purpose in leveraging technology to support historical thinking in the social studies classroom. *The International Journal of Social Studies Education, 21(2)*, 142-168.

Villegas, A. M., & Lucas, T. (2002). Preparing culturally responsive teachers: Rethinking the curriculum. *Journal of Teacher Education, 53(1)*, 20-32.

Young, J. R. (2009). Six lessons one campus learned about e-textbooks. *Chronicle of Higher Education, 55(39)*, A18.

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Resources

Carolina Digital Library and Archives - <http://cdla.unc.edu>

CK-12 FlexBooks (CK-12 Foundation site) - <http://www.ck12.org/flexr/>

Digital Durham - <http://www.digitaldurham.duke.edu/>

EDUC 415's Digital Flexbook - <http://unceduc415.pbworks.com/>

Harcourt Horizons -
http://www.harcourtschool.com/menus/harcourt_horizons/topmenu/index.html

Jing - <http://www.techsmith.com/jing/>

Learn NC: North Carolina History: A Digital Textbook -
<http://www.learnnc.org/lp/projects/history/>

North Carolina Maps -
http://dc.lib.unc.edu/cdm4/item_viewer.php?CISOROOT=/ncmaps&CISOPTR=2074&CISOBOX=1&REC=15

Prezi - <http://prezi.com/>

21st Century Physics Flexbook: A Compilation of Contemporary and Emerging Technologies - <http://www.ck12.org/flexr/flexbook/735/>

Pbworks - <http://www.pbworks.com/>

Twitter - <http://twitter.com/>

Voicethread - voicethread.com

Voki - <http://www.voki.com/>

YouTube - <http://www.youtube.com/>

Sample Chapters

Anti-War Protests - [http://unceduc415.pbworks.com/1\)-Introduction](http://unceduc415.pbworks.com/1)-Introduction)

Children of the American Revolution - [http://unceduc415.pbworks.com/d\)-American-Revolution-Overview](http://unceduc415.pbworks.com/d)-American-Revolution-Overview)

Civil Rights Era - [http://unceduc415.pbworks.com/C\)-Introduction](http://unceduc415.pbworks.com/C)-Introduction)

Colonial Era - <http://unceduc415.pbworks.com/1-Intro-to-Colonial-Era>

Education Continued - [http://unceduc415.pbworks.com/w/page/25001543/G\)-Education-Continued](http://unceduc415.pbworks.com/w/page/25001543/G)-Education-Continued)

Employment - <http://unceduc415.pbworks.com/w/page/24770053/N%29-Employment>

Family Life During World War II - <http://unceduc415.pbworks.com/A-Introduction-Family+Life+in+WWII>

History Through a Child's Eye - <http://karenkuntaricheduc415.pbworks.com/w/page/20267341/History-Through-a-Child's-Eye>

Jazz Age in North Carolina - <http://unceduc415.pbworks.com/0-Introduction>

John Coltrane - <http://unceduc415.pbworks.com/w/page/24747751/4-John-Coltrane>

Native American's in North Carolina - <http://unceduc415.pbworks.com/E:-Introduction>

North Carolina's Involvement in the Civil War - <http://unceduc415.pbworks.com/a-Cover>

Protesting in the 21st Century - [http://unceduc415.pbworks.com/w/page/24840984/11\)-Protesting-in-the-21st-Century](http://unceduc415.pbworks.com/w/page/24840984/11)-Protesting-in-the-21st-Century)

Railroads and Technology - <http://unceduc415.pbworks.com/w/page/25051916/L:-Railroads-and-Technology>

Wilmington Rail Road - <http://unceduc415.pbworks.com/w/page/24261917/E:-WIKI-Introduction>

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