

Title:Using technology to teach historical understanding: the digital history reader brings the possibilities of new technology to the history classroom.

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WHILE SOME TEACHERS may believe that certain websites or software applications simply add "bells and whistles" to entertain without educating, the proper use of technology can significantly enhance teaching and learning--the key is identifying the ways that teachers can best teach and students can best learn. (1) Faculty in higher education can contribute to this process by designing digital history projects that integrate technology with substantive content and effective pedagogy Teachers can contribute by shaping these projects to meet their own objectives and circumstances. A development process that involves historians consulting with teachers about classroom applications and curricular content and teachers consulting with historians about methods of historical inquiry and source analysis can contribute to successful digital history projects.

Today's students are generally accustomed to seeing timelines of events, lists of names, and bulleted items, yet they lack an understanding of the complexity of historical analysis. (2) Learning to read historical information from charts, for example, teaches students to evaluate the significance of change. Comparing related primary sources can enhance understanding of historical patterns. Having students consider changes in terms of options, choices, and consequences, helps them develop a sense of history as a process shaped by individuals and communities. This article describes three models for developing these skills in an online format: a cost of labor calculator that allows students to compare slavery and indentured servitude in colonial America; an animated graph that charts European unemployment during the Great Depression; and a dynamic analysis of photographs of a student protest in 1968. In each case, educational technology makes it possible to provide students with innovative ways to understand complex problems in history, while addressing national and state standards for the social studies.

The three models described in this article are part of a larger technology-based teaching project, The Digital History Reader (DHR). (3) A collaborative effort involving historians, educators, and technology specialists at Virginia Tech, the DHR provides a content-rich, inquiry-based, and instructionally-proven online resource for teaching European and United States history. The project contains components that integrate the most valuable elements of classroom environments and primary source analysis with the possibilities of new technology. Because the digital environment creates new opportunities by manipulating images, constructing interactions, and demonstrating sequence, educational technology can teach more complex forms of historical understanding.

Using an Online Calculator to Study the Decision to Enslave Africans

Why English colonists chose to adopt slavery in America and to enslave Africans rather than Native Americans is a question that continues to fascinate historians. (4) Some experts maintain that English colonists rarely enslaved Indians on the North American mainland because to do so would have incited attacks of revenge by the kin of such slaves. The colonists did, however, occasionally sell the survivors of tribes they had defeated in war into slavery in the West Indies.

The module, "Unthinking Decision? Why Did Slavery Emerge in Virginia," describes the economic, religious, demographic, and political factors that shaped this decision. (5) A brief narrative essay explains that tobacco plantations in Virginia initially relied on white indentured servants for labor and only switched to African slaves during the final decades of the seventeenth century; the module then presents students with documents illustrating the racist attitudes of early English settlers, the highly exploitative nature of indentured servitude, and the links between tobacco cultivation and unrest among Virginia's Native Americans, poor white settlers, and wealthy tobacco planters. These documents help students understand the context in which Virginia's wealthy white settlers made the critical decision to enslave Africans.

The cost of labor calculator provides an effective way for students to learn how economic factors shaped this significant transition. (6) During the first half of the seventeenth century, indentured servitude was more cost effective than slavery. The initial cost of a slave was much greater than that of a servant, and high rates of mortality meant that neither servants nor slaves lived very long after their arrival. Thus, even the potential greater length of a slave's lifetime of service did not compensate for the higher purchase price. After about 1660, however, servants became somewhat more expensive; increased life expectancies meant that slaves could work longer; and the decreasing price of tobacco forced planters to reduce costs. By the end of the century, slaves emerged as a better economic choice, and the labor force on tobacco plantations shifted away from indentured servants.

The cost of labor calculator is designed to help students discover how people living at the time came to this decision. Students enter values for these variables:

- * The price of a worker is the cost of equipping and transporting a servant to Virginia, buying the remaining time on a servant's contract, or buying a slave.
- * The length of a servant's term is the number of years an indentured servant agreed to serve in return for passage to Virginia; a slave's term was always a lifetime.
- * Average life expectancy is the number of years a worker could expect to live after arriving in Virginia.
- * The price of tobacco is the price in shillings or pence, sterling, for a pound of tobacco.

Students initially fill in the variables with data from graphs provided with the calculator. Pressing the "calculate" button generates annualized cost (initial cost divided by years in service) and profit (gross income per worker, based on the price of tobacco, minus annualized cost). Through these calculations, students should recognize that slaves became more profitable than servants sometime after 1660, and thus can understand the economic factors that shaped this outcome. Allowing students to make these calculations on their own teaches them the significance of certain factors in the complex process of change.

The cost of labor calculator thus addresses a key component of social studies standards involving "issue-centered analysis and decision-making activities." (7) By addressing the adoption of slavery as a historical question, rather than as an established fact, students are able to consider alternative forms of "unfree" labor, evaluate the relative significance of contextual factors, and recognize how economics shaped the decision to enslave Africans.

Charting European Unemployment during the Great Depression

Historical topics that involve economic processes often require students to master information presented in tables, graphs, or charts. The module, "The End of Optimism? The Great Depression in Europe," explores economic conditions, social structures, and especially political behavior during the early 1930s. (8) In Europe, as in the United States during the Depression, the image of the unemployed, especially young and middle-aged men, became one of the most common, and also most disturbing, symbols of the deepening crisis.

(9) These images were powerful precisely because they represented a much broader phenomenon involving millions--a numerical relationship best conveyed through a visual representation such as a graph. However, getting students to recognize the extent of the unemployment is a challenge, as numbers, chronology, and differences between countries can be difficult to grasp. (10) While knowing exact numbers is less important than understanding scope, sequence, and significance, students need to know more than just generalizations in order to convert this information into complex historical understanding.

This module presents students with an animated graph showing unemployment in Germany and Britain--two countries chosen to illustrate similarity (unemployment in both countries increased significantly after 1929) and difference (German unemployment fell dramatically after the Nazi Party came to power in early 1933, whereas the British National Government, formed in 1931, brought only limited decreases in unemployment). Unemployment is indicated in terms of total numbers and as a percent of the workforce. The crucial innovation is using Macromedia Flash to animate the graph: students can actually watch as the unemployment rate changes year by year. Showing this change over time allows students to appreciate the extent of this problem and compare the timing of changes. Nazi public works and rearmament projects help explain the sudden decrease in German unemployment after 1933; the British governments, however, refused to spend public funds needed to eliminate mass unemployment. While designed for students to use independently in combination with documents in the module, this format also lends itself to classroom use. A teacher could "stop" the graph at crucial moments--such as 1932 when German unemployment approached six million--to ask about the implications of this crisis. Once students have recognized both the impact and the extent of unemployment, they are then in a better position to appreciate the desperate accounts of being unemployed, analyze protests by radicalized workers, and assess the promises of political leaders who recognized the danger of mass unemployment.

Teaching Critical Analysis: Images of Political Action in 1968

Students need to be taught how to "read" visual sources in much the same way they are taught to read textual documents. The module, "1968--A Generation in Revolt?" uses photographs and cartoons, as well as texts and videos, to explore the motivations and implications of protests in Paris, Prague, Mexico City, and Chicago. (11) This module recognizes that as students continue to be inundated with visual information, they must learn to interpret visual materials with a critical eye. (12) Teaching with photographs poses particular challenges. Though students in the era of digital manipulation understand that images may not represent the truth, they still tend to accept uncritically that historical photographs capture a moment in time. Students need to understand how photographs--even in the pre-digital era--not only reflected reality, but also actively constructed that reality.

In a classroom, the teacher can present students with an image and talk them through an analytical process by asking questions that elicit a deeper understanding. The DHR pursues this same kind of pedagogy, but in an asynchronous environment, by using the web-based Macromedia Flash objects to combine animated visual images and audio voice-overs. Two photographs taken in Grant Park during the riots at the Chicago Democratic National Convention in August 1968 illustrate the added value of this approach. Students are first presented with a photograph of young people crouching by a fountain. The image itself is ambiguous; the viewer cannot tell what the people in the photograph are doing and thus has no basis upon which to determine the image's significance. While a voice-over asks students leading questions, specific parts of this image are highlighted. Then a second photograph from the same evening shows National Guard members marching through a hazy fog in the park. Within this photograph, the focus shifts specifically to the fog. Given this combination of images, students realize that what appeared to be fog was in fact teargas. When the first photograph is shown again, students recognize that the young people at the fountain were actually washing teargas from their eyes. The additional knowledge derived from making this comparison thus changes the interpretation of the photograph's historical significance.

By using this dynamic presentation, students learn that photographs contain multiple layers of meaning, and

that understanding context is as important for interpreting images as for interpreting texts. By asking students to think about images, this technology teaches about context, sequence, and meaning in ways that can help students understand meaning in other situations as well.

Evaluating the Effectiveness of Technology in History Teaching

Do these approaches promote more effective learning? Our preliminary tests, which included using these materials in higher education classrooms and demonstrations of these materials at workshops attended by teachers, showed that they do. When these materials have been presented to experienced secondary teachers and used in classrooms, we have received the desired response: that the technology conveys the complexity of historical understanding without sacrificing content knowledge and thus enhances student learning. In this way, digital history enables teachers to promote more complex understanding of significant historical issues. More importantly, teachers may also be inspired to explore new ways of engaging learners in both virtual and classroom contexts. Doing history in a digital world deepens and enriches historical understanding in ways that promote mastery of content and the acquisition of essential skills.

Notes

- (1.) See Larry Cuban, *Oversold & Underused: Computers in the Classroom* (Cambridge, Mass.: Harvard University Press, 2001); Gary J. Kornblith and Carol Lasser, "More than Bells and Whistles? Using Digital Technology to Teach American History," *The Journal of American History* 89, no. 4, (2003) www.historycooperative.org; John K. Lee and Kathryn Robinson, "The Graphing Calculator: Helping Students Explore Social Studies Topics," *Social Education* 67, no. 3 (2003), 151-153.
- (2.) For a similar argument, see Bruce A. VanSledright, "What Does It Mean to Think Historically ... and How Do You Teach It?" *Social Education* 68, no. 3 (2004), 230-233; Cheryl Mason Bolick and Meghan McGlenn, "Harriet Jacobs: Using Online Slave Narratives in the Classroom," *Social Education* 68, no. 3 (2004), 198-202; National Center for History in the Schools, *National Standards for History Pt. 2, Ch. 2, Standard 3*, chs.ucla.edu/standards.
- (3.) Each of the 18 modules is devoted to a particular historical topic and includes an introduction, narrative context, multimedia primary sources, a conclusion, assessment questions, and a guide to further resources. As modules are completed, they are made available for classroom use: www.dhr.history.vt.edu. The DHR has been funded by Virginia Tech and an Exemplary Education grant from the National Endowment for the Humanities. Applications described here require the free Macromedia Shockwave Player, www.macromedia.com.
- (4.) For more discussion of the shift to slavery, see "What Were the Origins of American Slavery?" Digital History site at the University of Houston, www.digitalhistory.uh.edu; "The Terrible Transformation" PBS online, www.pbs.org; Winthrop Jordan, *White Over Black: American Attitudes Toward the Negro, 1550-1812* (Chapel Hill: University of North Carolina Press, 1968; reissued 1995); Edmund S. Morgan, *American Slavery, American Freedom: The Ordeal of Colonial Virginia* (New York: W.W. Norton, 1975; reissued 1995); David W. Galenson, *White Servitude in Colonial America: An Economic Analysis* (New York: Cambridge University Press, 1981); Edward Countryman, ed., *How Did American Slavery Begin?* (Boston: Saint Martin's, 1999).
- (5.) www.dhr.history.vt.edu/us/mod02_slavery/index.html.
- (6.) For the use of calculators in social studies lessons, see Lee and Robinson, 151-153.
- (7.) NCHS, *National Standards for History Pt. 2, Ch. 2, Standard 5*.
- (8.) www.dhr.history.vt.edu/eu/mod04_depression/index.html.

(9.) Patricia Clavin, *The Great Depression in Europe, 1929-1939* (London: Macmillan Press, 2000), 112-117.

(10.) For the challenges of teaching quantitative analysis, see Bob Peterson, "Understanding Large Numbers," *Rethinking Schools Online* 18, no. 1 (2003), www.rethinkingschools.org; Mark Freeman, "Teaching Quantification in History," Higher Education Academy Subject Centre. Overnight Expert Guide (Learning and Teaching Support Network, 2004), www.hca.ltsn.ac.uk.

(11.) www.dhr.history.vt.edu/eu/mod05_1968/index.html.

(12.) On teaching visual literacy, see Michael J. Berson, "Digital Images: Capturing America's Past with the Technology of Today," *Social Education* 68, no. 3 (2004), 214-219; Maria Avgerinou and John Ericson, "A Review of the Concept of Visual Literacy," *British Journal of Educational Technology* 28 (1997), 280-291; Mary Bums and Danny Martinez, "Visual Literacy--Visual Imagery and the Art of Persuasion--Teaching the Hidden Meaning of Images," *Learning and Leading with Technology* 29, no. 6 (2002), 32-35.

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