

**FINAL REPORT & ANALYSIS: EVALUATION OF HISTORY 400W**

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## Introduction/Background

Dr. Elizabeth Pollard, an Associate Professor of History at San Diego State University, has focused significant effort on incorporating technology into the curriculum of **History 400W - The Historians Craft**. To that end, she has conducted classes in AH1112, the Experimental Classroom in the Adams Humanities building, making use of, among other things,

- The Smart Technologies SmartBoard.
- Windows XP and MacOS laptop computers for students.
- Apple Remote Desktop software that allows her to display student laptop displays through the SmartBoard as well as both classroom LCD projectors.

In addition, Dr. Pollard created

- A class site for both her Tuesday and Thursday evening History 400W courses within the Blackboard course management software system. This allowed Dr. Pollard to provide online access to critical course material, as well as to communicate vital course information to students via Blackboard announcements.
- Additionally, the Library's *Electronic Course Reserve* feature was employed to set aside on-line library resources for her students that were complementary to the course.

Dr. Pollard wished to evaluate the impact of this infusion of technology on the course. To help with the development, implementation and analysis of observation and survey instruments to aid in the evaluation, Dr. Pollard worked with Educational Technology Chair Marcie Bober to find a graduate student in Dr. Bober's Ed795A course who could consult with Dr. Pollard on this project.

As a former software engineer, I had a reasonably strong project design and development background, but I had no previous experience in performance evaluation, and was eager to develop skills that would help me in this area. Given my desire for growth in evaluation techniques, my software and web development background, and my background in using a broad variety computer software and hardware, I was selected as the consultant for this project.

Over the initial period of the project Dr. Pollard and I worked to define what my responsibilities would be. We determined a minimum set of services required that would provide Dr. Pollard with a reasonable dataset to make decisions and use in an subsequent studies, and that would satisfy the requirement for the Ed795A course. Those services included:

- No fewer than 2 observations of her classes, one observation of her Tuesday evening students, and the other of her Thursday evening students.
- Definition and dissemination of two surveys, one performed on Week 10 at mid-term, and another administered after the final week of classes. These surveys of all of her History 400W students would solicit input on their perception of the efficacy of the use of technology into the History 400W classroom.
- Interpretation and Analysis of the results of the Week 10 survey.

In addition, Dr. Pollard required a report interpreting and analyzing results from the final week survey, but this would not fit within the time constraints of the Ed795A course, so we decided to write up 2 contracts, one covering only the material that could be concluded by

the final day for report submission for the Ed795A course, and another contract that would allow for the fulfillment of the final requirement to interpret and analyze results extracted from the final survey.

Over the course of the contract, Dr. Pollard and I were able to schedule an additional observation, and determined that uploading a final peer review survey was crucial to her course evaluation and could be included within the project time constraints. As a result, the scope of my work for Dr. Pollard comprised;

- Three observations of her History classes:
  - An observation of her Thursday class on October 27<sup>th</sup>, 2005.
  - An observation of her Tuesday class on November 8<sup>th</sup>, 2005.
  - An additional observation of the Tuesday class on December 6<sup>th</sup>, 2005.
- Dissemination of three surveys:
  - A mid-term technology survey uploaded to Blackboard and made available to student during Week 10 of the semester.
  - A final technology survey uploaded and made available to students on Week 15 of the semester.
  - A peer review survey also made available on Week 15.
- Interpretation and Analysis of the results of the three observations.
- Interpretation and Analysis of the results of the Week 10 mid-term survey.

### **Purpose/Intent**

The purpose of this evaluation was to develop sufficient data through observation of classes and surveys of the students to make clear statements concerning the efficacy of the use of technology into Dr. Pollard's classes, and to specify a series of recommendations concerning incorporation of technology in subsequent course offerings by Dr. Pollard in this area. By determining the efficacy of the infusion of technology in the course, and providing a framework based on these findings from this evaluation, Dr. Pollard could both make recommended changes or additions to the course and how technology was used within it, and use the data provided as a foundation for further research.

The major stakeholders for this study are

- Dr. Pollard, who has a strong interest in furthering the effective use of technology into her courses.
- Current students of the History 400W course, who are active participants in this study.
- Future students of this history course, as well as other courses taught by Dr. Pollard.
- Professors interested in infusing technology into their courses, who may be the indirect beneficiaries of the findings of this evaluation and future studies based on these findings by Dr. Pollard.

There were a number of constraints that limited the scope of this study.

- Time constraints prevented any attempt at developing and administering pre- and post-tests to determine levels of technological ability of the History 400W students before and after the class.

- Time constraints also prevented the inclusion of an interpretation and analysis of the results of the final week survey into this final project report.
- Scheduling constraints prevented me from making additional observations of classes in order to increase confidence in the results of the observational findings.

### **Impact of the Literature Review**

I began the literature review searching for studies specific to the incorporation of computer-assisted instruction into college level history courses. The intent was to find from existing studies what types of technological interventions worked, and what types didn't fit well within the framework of a history class.

I wasn't able to find anything specific to higher education history classes incorporating technology any more recent than 1998; given how closely technological breakthroughs have paralleled Moore's law (A statement attributed to Intel founder Gordon Moore that the number of transistors on, and therefore the speed of, microprocessors will double every 12 to 24 months), and the number of changes in what can be accomplished with expanding technology with this greater power, these 7 year-old articles represented significantly outdated technology.

However, some of these articles touched on classroom enhancement via technology that proved useful. Kontos (1995) focused primarily on distance education, but touched on the use of collaborative learning that allowed students to work together and help one another with technology while dealing with content-specific problems.

As I discussed the structure and organization of the History 400W classroom and it's informational content with Dr. Pollard, as well as the role I would take on as observer and data analyst, it became evident that I would benefit to a greater extent from information about performing observations and interpreting and analyzing surveys.

Worthen, Sanders & Fitzpatrick (1997) specified structured methods of observation that could elicit quantitative information concerning interactions between teacher and student, students with other students, and as importantly, instructor and technology and student with technology. They also pointed out how to structure observation instruments and observation goals beforehand to help codify and optimally capture desired information during the actual observation.

Gay and Airasian (2003) expand on this theme by introducing me to the different roles the observer could take during an observation. It became clear from this work that adopting the role of a non-participant, naturalistic observer, while potentially preventing me from getting first-hand data on student's attitudes on technology, would allow me greater latitude in recording quantitative data on the behaviors and interactions with technology during class. The survey questions would be the primary method for getting access to student perceptions concerning technology infusion into the classroom. I also adopted a descriptive, chronological style of note-taking based on information from Gay and Airasian. Streamlining of the recording methods I employed came from information in Wiseman (1999).

## Methodology

The observations of Dr. Pollard's classes were implemented to extract information along the following indices;

- Instructor infusion of technology into the structure of the class material.
- Student use of technology both during and outside of class.

Based on the above indices, we focused on attempting to answer the following questions:

- How effective were the specific technology components employed during class and outside of class in helping students develop their understanding of historiography?
- What specific technological components did students feel worked best in helping them learn?
- What role did PowerPoint, both as a presentation mechanism and a tool for organizing and structuring thoughts, play in students' development of their book reviews and in their understanding of class material?
- Did technology ever get in the way of learning, or impede class flow?
- Did students think that they would use some of the techniques developed in this class in subsequent classes or research/study opportunities?

The development of a thorough set of survey items, designed to allow broad input latitude that would not unintentionally guide his or her answers in a particular direction, would help answer questions concerning student perception about technology in the classroom, as well as whether students felt that technology ever impeded understanding or hindered class flow. In order to determine the actual effect of technology on the classroom, and to determine student comfort with, and use of, technology inside the classroom required a series of observations of both classes. The number and depth of the observations would determine the level of confidence in the results. Without observations of all 400W classes, the sampling could get skewed, if, for example, a greater number of students arbitrarily chose to be the Tuesday class. In addition, observing both classes both early in the semester and towards the end of semester could provide data on changes in the student's ability with technology, and their comfort level in using it. Surveys administered both earlier in the semester and toward the end could similarly provide information on changes in student perception toward technology. It was possible to offer surveys around the mid point of the semester as well as at the end, however scheduling prevented me from being able to schedule observations for both classes earlier and toward end of classes; I was only able to do this for the Tuesday evening student group.

Given that the number of students involved in these classes was relatively small, the intent was to offer the survey to all of them; requiring the students to take the survey would have improperly affected the results of the survey. As a result, the survey was made voluntary, with a number of emails sent from the teacher, as well as a Blackboard notification whenever students logged in and went to the 400W course, making students aware of the survey and indicating how to navigate to it.

The survey instruments were developed almost entirely by Dr. Pollard. I provided some suggestions on additions to both the mid-week survey and the final survey. Dr. Pollard developed the surveys to extract as accurately as possible student perception of what effect,

if any, the technological interventions had on students' understanding of the concepts critical to the field. One aspect of the developed surveys that I missed until Dr. Bober stepped through Week 10 results with me was that a number of the Likert scales associated with some survey items were skewed toward finding technology useful. Specifically, Dr. Bober pointed out that Items 1 through 7 of the Week 10 survey had 5 scale ratings (along with 1 rating of 'Not Applicable'). Of these 5, 4 indicated some level of usefulness, with the highest rating of 'extremely useful' having no equivalent negative rating of, say, 'extremely useless' (These scale rankings are presented in Table 1 below). Dr. Pollard acknowledged this, but felt that since the intent was to measure level of usefulness, this question about scale skew would probably not have a significant effect on the results. Dr. Pollard did make a change to take this question into consideration for the subsequent final week survey. In addition, I adjusted my interpretation of the week 10 survey data to take this potential skew into consideration.

Likert Scale Ratings - Questions 1 through 7, Week 10 Survey					
not useful	somewhat useful	useful	very useful	extremely useful	not applicable

Table 1 - 4 of the 5 ratings (Not including 'not applicable') indicate some level of usefulness

Observations instruments were structured to attempt to obtain as much quantitative information as possible from each observation. To that end, a non-participant observation was decided on, a list of event types was compiled that would take into account most technological events that took place during the course, and that list was codified to produce a concise set of event codes representing the types of events incorporating technology during class that were important to the class material and that would effect students understanding and class outcome. An initial set was developed for the first observation. Table 2 below shows the coding and the events they intended to capture.

Code	Description
SB	Reference/Use of SmartBoard
PPT	Instructor or student PowerPoint presentation
Bbd	Reference to/Access of Blackboard
ROS	Request for Student Online Search
UOS	Un-requested Student Online Search
ROD	Reference to Data accessed Online
OT	Student use of online resources that is Off-Task (Email check, web surf, etc.)
ARD	Instructor shifts projector display to student computer via Apple Remote Desktop
DS	Difficulty of transitions between technology resources. <ul style="list-style-type: none"> <li>DS-10 - Unable to perform transition</li> </ul>

Code	Description
	<ul style="list-style-type: none"> <li>• DS-9 - Extremely difficult transition</li> <li>• DS-1 - Extremely easy/seamless transition.</li> </ul>
HC	Reference to/access of offline, hardcopy documents or resources by instructor or students.

Table 2 - Coding Scheme for Observation 1

This coding scheme was later modified to capture pertinent data witnessed during observation 1 and not accounted for in the initial scheme. Table 3 presents the updated coding scheme, which includes codes for on-line search type (Generic or specific on-line article database), as well as Technical Difficulties encountered, time expended on the difficulty and whether the difficulty was resolved. This updated scheme appears in Table 3 below.

Code	Description
SB	Reference/Use of SmartBoard
PPT	Instructor or student PowerPoint presentation.
Bbd	Reference to/Access of Blackboard
ROS	Request for Student Online Search
UOS	Un-requested Student Online Search
ROD	Reference to Data accessed Online
OT	Student use of online resources that is Off-Task (Email check, web surf, etc.)
ARD	Instructor shifts projector display to student computer via Apple Remote Desktop.
DS	Difficulty of transitions between technology resources. DS-10 - Unable to perform transition DS-9 - Extremely difficult transition DS-1 - Extremely easy/seamless transition.
ECR	Online search using one of the online catalogs from this list: JSTOR Web of Science (WOS) ERIC EBSCO
GOS	Generic Online Search (Google, Ask.com, Yahoo, etc.)

Code	Description
TD	Technical Difficulty/Problem Encountered Include time spent (mm:ss) Solved (Y/N) If not solved, explain resolution (New computer, reboot, task change, etc.),
HC	Reference to/access of offline, hardcopy documents or resources by instructor or students.

Table 3 - Coding Scheme for Observations 2 and 3

There were two stages to the analysis of data rendered from observation and surveys. Two of the observations took place before the Survey even went live for students to access, and the observations each drew out enough data concerning student interaction with technology via their laptops as well as instructor usage during the course of the class to draw some conclusions about impact. As a result, some initial analysis was incorporated into the reports of each of the three observations performed.

The analysis of the data drawn from the survey observations benefited to a great degree from a discussion with Dr. Bober; based on that interaction, I focused on attempting to triangulate data between the survey and observations by identifying key themes within the survey, searching the observational data for it's own set of themes, and working to find correlations between the data. While data from the Likert scale questions elicited data associated with student perceptions of the technology infused into the classroom, most of the themes from the survey data were extracted from the essay responses students made. Comparing and contrasting these themes with observation data would allow for richer analysis of the evaluation data.

### Limitations/Constraints

There were one limitation, and a few constraints that prevented a more in-depth evaluation. Our options for evaluation instruments were limited by the start date of the evaluation project a few weeks into the semester. It would have been interesting to consider pre- and post-test evaluation instruments for providing a greater degree of certainty with respect to change in student's abilities with respect to using technology over the course of the intervention. Discussions with Dr. Pollard didn't begin until September 27<sup>th</sup>, almost a month into the semester.

In addition, time constraints based on prior commitments on my part prevented me from taking a more active role in the development of the survey instrument. As strong an instrument as Dr. Pollard developed, had I committed more of my time to researching survey instruments, I may have brought a broader array of survey items to the table along with a some suggestions on scaling issues.

Prior commitments and scheduling constraints also limited the number of class observations I could make to 3. While this was greater than the minimum of 2 that Dr. Pollard and I initially

agreed on, at least one more observation of her Thursday class scheduled at the end of the semester would have provided greater confidence in the validity of the some points generated from the observation analysis.

## Analysis/Findings

Findings and analyses were reported for each of the observations, and an additional analysis derived from the results of the Week 10 Survey were reported separately over the course of the evaluation. I'm including the salient aspects of those findings and analyses here.

### Results from Observations

Minimal problems with technology for the instructor were observed during the three observations. During the initial observation in October no technical difficulties greater than 1 (according to the observation coding scheme) were recorded for the Dr. Pollard. Observation 2 on November 8<sup>th</sup> included significantly more technical difficulties, but all of these were later traced to a faulty USB hub on the Instructor's computer, suggesting that some of the difficulty results from this observation were outliers. The final observation on December 6<sup>th</sup> seemed to bear this out; no transition problems at all were recorded, and the 2 technical difficulties encountered by the professor with resolved within 5 seconds in each case.

In addition, minimal problems with technology were observed for the students, most of whom were observed to be novices with technology. During the first observation, only 3 transition difficulties of 4 or greater (based on the observation coding scheme) were recorded; these problems were associated with students transitioning between slides during their PowerPoint presentations; each presenter ran into this transition difficulty for their first slide, and once it was overcome either by the student on his own, or from input from Dr. Pollard, the difficulty wasn't repeated for that student. During the initial observation, 2 students were observed having some trouble with the advanced search techniques for one of the online article databases, but these were resolved by input from classmates or the instructor. Online searches by students during subsequent observations did not require classmate or instructor input.

The infusion of technology was not observed to be an impediment, or source of frustration, for students during the class, even when significant problems occurred during the Tuesday evening class for the 2<sup>nd</sup> observation. Very few 'Off-Task' events were recorded during observations 1 and 3, and when a higher degree of problems were encountered during observation 2, no greater number of students going off-task was observed.

### Results from the Week 10 Survey

Questions specific to problems with control transfer between Instructor's computer and student laptops, and to any impediments to learning posed by technology, were negative. Overall, students did not believe technology got in the way of learning. Figure 1 below shows results from Question 21 on the survey concerning whether technology interrupted or impeded flow of the course.

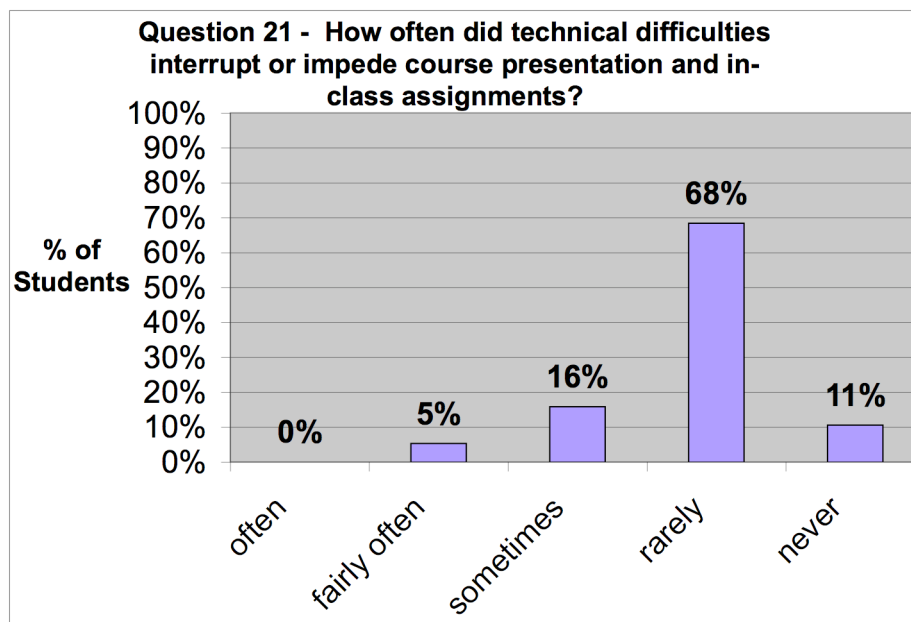


Figure 1 - Result of Survey Question 21

Students perceived most of the technological components incorporated into the class structure to be useful overall, aiding their understanding of the course subject matter. Questions 1 through 7 covered specific technological components Dr. Pollard included in the course structure, and with the exception of the on-line discussions from in questions 5, all were ranked in the top 3 ratings by the majority of respondents. The table of Figure 2 shows the responses in the bottom 2 and top 3 ratings for questions 1 through 7, ordered by top 3 ratings.

Class Component		% rating in bottom 2	% rating in top 3
4	In-class Discussion	0	100
1	Videos (weeks 1, 6, and 10)	0	100
7	E-mails from Professor/ Announcements (on Bb)	5	95
2	Smart Board (for in-class brainstorming)	16	84
6	Electronic Course Reserve (ECR)	26	74
3	On-line Summaries (on Bb)	42	58
5	On-line Discussion (on Bb)	58	32

Figure 2 - Respondent's rankings of Technological Components

Students believed that PowerPoint, both as a presentation tool and as a means of aiding in the organization and structure for writing a review, was an effective tool. 4 questions from the survey focused on the use of PowerPoint; Question 11 and 14 on the impact of the instructor's use of PowerPoint in class, Question 12 on the impact of students' classmates use of PowerPoint, and Question 13 on how PowerPoint impacted the way they structured their book reviews. Questions 11 and 13 were Likert scale items, and students rated the usefulness of PowerPoint in the top 2 ratings 74% and 95%, respectively. Questions 12 and 14 required essay responses from the students, and the responses were overwhelmingly positive.

### Analysis of data from Observations and Week 10 Survey

Infusion of technology overall worked well for the course. Students were observed to be engaged with the course material, and while a handful of technical difficulties were observed, Dr. Pollard did not dwell on them, and as a result, neither did the students. This was borne out in responses to survey questions about technology in general, with the majority of students indicating that it didn't get in the way. In addition, survey questions concerning specific technological components showed strong sentiment by students that the components were useful. Exceptions to this, specifically the use of on-line discussions and blogging within Blackboard, should be examined uniquely.

Students seemed to be engaged by, and responded to, videos presented during class and images incorporated into PowerPoint presentations. There was definite engagement by the majority of students during discussions between clips of *The Crucible* shown during Week 10, somewhat more than the level of student engagement witnessed during the initial observation session. In addition, survey questions requesting input on aspects of PowerPoint that that were successful drew numerous responses concerning how helpful and engaging the images within the presentation were, with particular emphasis on usefulness of these images to visual learners.

There was also evidence of growth in the ability to use technology by students over the course of the semester. During the final observation, more students went on line unbidden by the professor to perform searches for articles based on class discussion than in previous sessions. In addition, students responded that the online article databases were extremely useful, and the hands-on approach to learning to use them during the earlier class sessions were effective in developing students skills with the search tools, with numerous respondents suggesting that they would use these skills subsequent to this course.

Finally, it was evident from a number of responses to survey questions that some of the technological components in the course didn't seem to produce their intended effect, and should be examined to see whether they can be reworked into the course using an alternate approach. Specifically, students responded that on-line discussions and blogging within Blackboard was not a useful course component. Numerous responses pointed to being too busy, not having sufficient computer experience, or not feeling like they had anything unique to add beyond in-class discussion of the same issues.

## Conclusions/Recommendations

The three observations and the Week 10 Survey, intended to study the efficacy of infusing Dr. Pollard's History 400W with technology, yielded a number of useful results.

Overall, it's clear that the incorporation of technology into this course works. Observations of students in class showed a number of positive effects, and no observed negative impact, of the use of laptops and interacting with the instructor while she incorporated technology into her presentations. Students responded positively to components such as the use of DVD video clips to dramatize a point, the addition of images in the instructor's presentation to engage the students, and the use of online search tools to help them locate relevant documents. These observations also seemed to show student growth in the use of online article databases by students over the course of the semester.

Based on the observations and student input via the Week 10 survey, some additions or changes may help make the use of technology in History 400W more effective:

- Students responded very positively to images central to course material. Increasing the use of images and video may have a positive impact on student engagement in the course. This could be accomplished by locating (Or helping produce) more videos relevant to the course material, and by including more images that complement the course, either adding them to PowerPoint or developing a stand-alone course web site, apart from Blackboard, that includes these images, or links to repositories for them.
- Student growth was noted when using online article databases over the course of the three observations. Survey responses indicated that the hands-on approach to learning this particular tool was valuable. Examining other important skills to historiography, and developing hands-on instruction around them, may be useful for future class enhancement.
- Investigate options to on-line discussions within Blackboard. If it's determined that this represents a vital part of the course, attempt an alternative implementation, such as reducing complexity by taking the discussion and blogs out of Blackboard and placing it into a less navigationally cumbersome on-line tool, such as email replies or a Yahoo Group. If it's determined that this discussion is not critical to student development within the course, removing this component from the course could be considered.

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