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Cycle Three Report
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For Cycle Three, my research question was:

If I provide online access to primary sources, how will teachers decide to use them for K-12 classroom learning?

My Action

To answer this question and to extend my work from Cycles One and Two, I created an online presentation of the Marie Curie Case File. I then created a complementary online user survey.

In the online presentation of the Case File, I included an interactive, Flash-based interface for access to Le Radium. Through the interface, the user can "turn the pages" of Le Radium by dragging the corner of a page across the screen and dropping it to reveal the next page. The interface mimics the real experience of turning the pages of a book. In this way, the participants in Cycle Three had a similar first encounter with Le Radium as the participants in Cycles One and Two, minus the white gloves. The online presentation was intended to neutralize the "white glove syndrome" that I perceived in Cycle Two. The online presentation also dramatically increases the potential audience for The Franklin Institute's Case Files as a primary source collection for science education.

In the companion survey, I asked questions that were similar to the discussion topics from Cycles One and Two. I asked participants to reflect upon the experience of interacting with the Curie Case File. I asked for classroom applications. I asked for the likelihood that teachers would actually use the documents in classroom practice.

Drawing upon The Franklin Institute's existing Educators email list, I sent an email invitation to 290 regional teachers, inviting them to look at the Curie File and to participate in the online survey. As an incentive, I offered ten prizes through a random drawing. Each winner received four free passes to the Museum and the IMAX Theater. Participation was anonymous, however an email address was required for entry in the random drawing.

Knowing that teachers are likely to ignore e-mail during the hectic days of early June, my expectations for participation were low. I would have considered twenty thoughtful responses to be a very successful return. The actual count of fifteen quality completions, therefore, was a welcome result and an appropriate data set.

My Research

An underlying question for my research in Cycle Three relates to the phenomenon I am calling "white glove syndrome." As I analyzed my findings in Cycle Two, I began to suspect that the novelty of donning white gloves and paging through documents from a century ago was, in and of itself, so unique that objectivity became compromised. For Cycle Three, therefore, I neutralized the effect by using an online interface for interaction with the primary source materials rather than a physical encounter.

The use of technology for interaction with the primary source materials also enables limitless access to the Case File. Only a select few teachers can have direct, hands-on experiences with the Case Files. Online, however, there is no limit to the number of learners who can interact with the Case Files.

My Evidence

For Cycle Three, the online survey data provided my evidence. Fifteen teachers submitted quality responses to the survey.

Commonality of Reflective Descriptors

	#
interesting	10
fascinating	2
exciting	1
authentic	1
amazing	1
intriguing	1
informative	1

Classroom Applications of the Curie File

	Elem	MS	HS
Science			
Use as a model for the method and process of scientific research.		1	1
Look at the related health and medical developments that followed Le Radium.	1		
Connect with the periodic table.		1	
Connect with chemistry classes.		2	
Social Studies			
Consider the historical context of the science of radium.	1		

Consider the role of women in science and/or history. Construct a timeline of things that were happening in the world at the time.	3 1	1	1
Math			
Language Arts			
Write a biography of the scientist. Write a persuasive letter that could support the case. In French class, use Le Radium for a translation challenge.	1 1 1	1 1	

My Analysis

Considering that the fifteen teachers interacted with the Case File in isolation and completed the surveys independently, the commonality of the use of "interesting" as a reflective descriptor is extreme. Ten of the fifteen participants used the word as part of their free-form response. Despite the fact that fifteen teachers responded, the range of descriptors used in the responses is significantly smaller in the online survey than in Cycles One and Two. This reinforces my belief that conversation and dialogue are essential for meaningful interpretation of primary source materials.

The survey respondents identified their grade level from a dropdown list of options: elementary, middle, or high school. Nine teachers selected elementary, four selected middle, and two selected high school. As in Cycle Two, I noticed that elementary teachers suggested a more metaphorical use of the Case File, while middle school teachers saw more direct application for science education. Of the six classroom applications for science, only one came from an elementary teacher. Of the twelve social studies and language arts applications, eight came from elementary teachers. While such a small testbed should not be used to make conclusive statements, I do believe that the data is suggesting that the Case Files are most appropriate for use in middle school classrooms. The middle grades are an ideal time to offer students access to primary source materials that offer portraits of the nature of scientific practice. Access, reflection, narrative, and dialogue can combine to provide consequential science learning experiences for middle school students. The result may be a turn in the tide of student science apathy.

The quantity and quality of classroom applications suggested during Cycle Three pales in comparison to Cycles One and Two. Likewise, the variety and creativity of reflective descriptors used by the teachers in Cycle Three also falls short of Cycles One and Two. "White glove syndrome," therefore does seem to exist, although not in the way I suspected. My original hypothesis

was that direct encounters with primary source materials help teachers understand the nature of science and their role in the social network. During Cycle Two, I began to suspect that the novelty of the experience was affecting objectivity. Cycle Three neutralized the syndrome but did not change the essential fact that teachers did see practical classroom application for primary source materials, especially in the middle grades. The passion with which they expressed their opinions was directly related to whether or not they had worn white gloves. "White glove syndrome," therefore, is a transformative effect on teachers' understanding of their role within the social network of science and their passion for engaging students with the true nature of scientific practice.

My Reflection

Cycle Three brought me full circle, back to my original premise. During Cycle Two, I began to suspect that I may have been "stacking the decks" in favor of my personal beliefs about the importance of primary source materials in science education through the white glove experience. Cycle Three helped me to understand that there is objectivity in my premise and that technology can both mitigate the novelty and dramatically increase access.

In my original premise, however, I had no foreshadowing of the difference between elementary and middle school teacher use of primary sources. I began to notice this difference in Cycle Two and found it conclusively in Cycle Three. I also had no foreshadowing of the important role of dialogue in the interpretation of the Case File. My data—while gathered from a small testbed—indicates that the quantity and quality of expression correlates to the amount of conversation and dialogue that occurred during the teachers' engagement with the Case File.

Cycle Three has left me with mixed emotions about the role of technology in this process. While the online interface enables limitless access to the Case File, it also pales in comparison to the impact of the white glove experience. Cycle Three suggests that middle school teachers can most enthusiastically embrace the primary source materials via the web. This suggests that a targeted effort could be quite impactful. Cycle Three also suggests that the absence of dialogue reduces the quantity and quality of expression. Technology can facilitate dialogue, so perhaps the addition of a communications space where middle school teachers can talk about their encounter with the Curie File could further maximize the impact.