

CALIFORNIA DIGITAL LIBRARY / INTERACTIVE UNIVERSITY PROJECT

*HIGH SCHOOL SOCIAL STUDIES TEACHERS:
THE USE OF DIGITAL OBJECTS IN TEACHING PRACTICES*

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Introduction

In the Fall of 2004, the IU conducted a *user needs assessment* for the California Digital Library. The assessment was undertaken in response to expressed needs of the California Digital Library's *American West* project, and provides an initial look at the ways in which high school Social Studies teachers use digital objects in their teaching practice.

The IU's *users' needs assessment* followed a recent study conducted for CDL by Alex Wright. The Wright study recruited participants from educational institutions and libraries in California and Colorado; the primary research objective was "to generate qualitative insights that could help guide the future development of the *American West* project, by exploring user needs, behaviors and expectations of online research tools."

This preliminary assessment targets immediate needs of the CDL in the American West project, it reports on current workflows, processes, and practices as expressed by interviewed subjects regarding digital content.

Past IU experience has shown that teacher "testimonials" provide the fullest expression of how teachers are currently using digital materials, of the kinds of materials they use, and of the tools they use preparing these materials. Our inquiry was designed to elicit descriptive stories that go beyond *multiple choice-type* examples of a teacher's general approach to work; we asked teachers to describe tasks they are currently engaged in, have just completed, or are planning. We aimed to acquire greater insight into teachers, teaching, and the role of digital materials through an approach that sought to capture the specific facts about practitioners' methods, needs, and desires as they are woven into a subject's narrative description of his or her practice. With this in mind, we focused on recruiting teachers first, then librarians; a future assessment phase might include district curriculum specialists and, perhaps, administrators.

Because infrastructure, expectations, professional development, latitude for teacher choice, skills, willingness to use technology, and job turnover vary from school to school and district to district, we considered it important to select interviewees from various school districts. In a subsequent assessment, we would like to explore urban, suburban, and rural areas.

As we analyzed the data we attempted to determine:

- how teachers are now using digital content and objects in research, personal knowledge enrichment, curriculum development, instruction, and student assignments and tasks;
- the kinds of tools that teachers are currently using, the tools that they need, and the tools they would like to have;
- teacher workflow for finding, gathering, creating, saving, and using digital objects.

Research Objective

The primary research objective of the IU assessment is: “How do K-12 teachers use digital materials in their teaching?” – where *teaching* is understood to span a range of activities, including:

- information gathering on the fly;
- research for content knowledge and definition;
- the use of materials in the creation of small and large supplementary curriculum resources;
- the creation of full grown lessons and units;
- materials that students are guided to and independently use;
- materials that students seek and find to interpret or create something new, such as a paper or presentation.

Method and Subjects

Interview Schedule: IU staff members Isaac Mankita and Chris Ashley jointly developed the interview schedule, with assistance from Jane Lee (CDL), under the guidance of Robin Chandler, Rosalie Lack and Felicia Poe. A copy of the interview schedule is included as Appendix A.

Recruitment: Eight teachers were interviewed during fall 2004. We contacted district curriculum specialists, high school social studies department chairs, and local professional development groups for teacher recommendations, asking for high school social studies teachers who are currently using technology in their teaching. Informed consent was sought from each subject consistent with acceptable practices for the protection of human subjects.

Data Gathering and Analysis: For all but one of the interviews, both an interviewer and an observer were present. Most teachers were interviewed in their classrooms or adjacent offices. One interview took place at the branch of the public library. Interviews were audio recorded, and conducted by the interviewer while the observer took notes. Partial transcriptions were made for accurate representation of statements recorded during the interviews.

Individual interviews were structured using closed- and open-ended questions. We asked about teaching experience and practice, teachers’ use of technology in all aspects of their work, and their use of digital resources in this work. Basic demographic information was also gathered.

In particular, we looked for commonalities in teacher practices. Our inquiry was informed by the central assumption of the IU’s Scholar’s Box project – if teachers are given easy-to-use online tools that enable them to “gather, create, and share” digitally archived information, they will find ways to integrate both tools and archived information into

workflows that create supplementary teaching materials. We attempted to understand how teachers actually work, by letting them tell us, and we came to a better understanding of what it means for a teacher to gather, to create and to share material, and what practices and actions are involved. We expect that our analysis and findings will suggest the types of functions to include in development of future services and tools.

Teacher Stories

(To protect privacy, pseudonyms are used to identify participants.)

JJ's role as a middle school librarian often means finding resources for teachers and classes, and often supervising student use of computers and resources while the class is in the lab. She often takes over the class to teach library research skills when a teacher brings students to the library. Sometimes she works with a group of 8 students – the number of working computers in her library – to research a specific topic. When teachers request her assistance, she consults her reference section, and then searches online, printing materials for teachers to review and use. She prepares packets of materials, but does not keep copies or paper files, expecting to find what's needed again, or anew, in the future. A recent request involved gathering materials related to the framers of the constitution, which she found mostly in her paper-based reference section, then supplemented with photographs found on the web.

Bob, a 30-plus year veteran teacher, relies heavily on the American Psychological Association (APA) site to find usable materials for his psychology class, but has also used other sites for history and literature courses. He places great trust in the APA site and the resources linked from their site. For example, for his unit on sleep – a favorite in his class – he scoured the site for short articles relating to sleep, sleep deprivation and dreams, using APA materials as core to the unit and only relying on the textbook as “supplementary” reading and for a handful of exercises. He particularly likes the clear organization into “latest news,” “books,” “for adults,” “for kids” and “monitor on psychology,” which makes the site easy to navigate and accessible for his use. Culling together resources found at that site is the beginnings of a good course syllabus.

Michelle, another 30-plus year veteran, teaches advanced placement (A.P.) courses in U.S. History and U.S. Government. She estimates that, over the year, students read between 200 (History) and 300 (Government) articles in addition to the textbook; in effect, she argues, these readings become central to the course itself. Michelle finds it very efficient to search the New York Times and Washington Post web sites, and pays out of her own pocket to print NYT articles that are no longer free. She begins her lesson planning with a question – sometimes one that is more related to the standards or the A.P. exam, and sometimes a question that may emerge from specific, relevant readings. In these cases, readings are selected and used with specific questions she wants her students to explore.

Rob likes to use images – political cartoons, maps, and, occasionally, a historical image,

for his teaching. He searches Yahoo and Google Images for these, and upon finding appropriate images, stores them in a PowerPoint file. He doesn't use PowerPoint as a slide-show tool, but rather uses it to store small collections of thematically related sources. He titles and archives his collections in folders organized for ease of use. He's not so interested in PowerPoint as a presentation software (though he does use it for that), rather, he opens an appropriate file and shows the image or images he wants for a particular lesson on the classroom projector or TV. He is able to select and sequence the archive of slides; he may present one, many, or all. Although PowerPoint files have the potential for annotation and elaborate presentations, he doesn't do that; he seemed not to have even thought of using PowerPoint for that.

Erik, also a veteran teacher with decades of experience, emphasized what some of his colleagues also mentioned: that much of his thinking and planning is prompted by readings from a stack of books at home, in Erik's case beside his bed. Like several teachers, who referred to their age and eyesight, Erik said that it was too difficult to read from the monitor, so he printed things for use. Like many teachers, Erik continues to do the bulk of his research by looking into traditional sources: published books. From these readings many of his ideas are formed; following that, he may begin a digital search for specific resources. His primary use of digital resources is to print them – sometimes these are in handouts for the class, he also likes to print posters for his classroom on a large printer at home.

Bernie, even with nearly 15-years experience as a teacher, Bernie often uses materials from the Teacher Curriculum Institute (TCI), which include short readings, worksheets, and slides. But because of technological and bureaucratic challenges, Bernie often finds himself printing out historical images, cartoons, and texts on overhead transparencies at a printer in a neighboring room to show on the overhead projector. He would like to have better quality images, but “what [he does] basically gets the job done and no one is suffering. It works for me,” he noted. Bernie argued that high quality technology was *not* necessary to make a big difference in learning – what is important is the depth of the teaching and learning activities going on in the classroom, and the range and level of analysis that one can do with students and available resources. He has sought research guides and examples for his students: “Plenty of teachers assign research papers, but not very many teach the process.” Bernie directs students to sites that describe the research process and provide examples of each stage of the stages. He referred to the outline and brief text at <http://www.mta75.org/curriculum/english/isearch/parameters.html> – which provides a detailed and well presented guide to the steps and requirements of a high school research paper.)

JD, a former e-recruiter for a Silicon Valley company in his fifth year of classroom teaching, reads the newspaper everyday online and saves potentially useful articles to his hard drive. He files them by general subject, and later moves them into folders for relevant courses and units. While he focuses on the New York Times as the newspaper of record, he also likes it because it provides the page number of the print edition – which is important for teaching proper citation to students. He will often project images and texts on an LCD projector for the whole class; at times his 9th grade students will read

aloud. He also uses the projector for group writing exercises, where he types as students make suggestions and corrections as the writing progresses.

Esteban, another recent entrant to teaching with 3 years experience, was by-far the most technologically savvy user in the group; he uses his windows-based laptop to search for articles and images to use for his own knowledge development; at times during class, he searches while teaching for information to interject into an ongoing discussion; he uses his Mac OS laptop to edit video projects that he does with students. Even more ambitiously, he has ripped DVDs and copied scenes out of them to create his own theme-based clip collections on DVD to show to his class. For example, to teach about the West for U.S. History, he collected clips from Western films to show the cowboy experience, and contrasting how that is portrayed in popular film versus other documents which give a very different picture of cowboy life. “It's not all John Wayne and bottles that easily break over someone's head in a barroom brawl,” he noted.

Findings

The subjects interviewed had a range of experience teaching social studies. Three had over 30 years, two between 10 and 15, and another two five or less. The middle school librarian is a former teacher with nearly 20 years experience. Interviewees represented three local school districts, Oakland, Berkeley and West Contra Costa, that have been recent recipients of technology-based grants. All subjects have access to high-speed connections through school- and district-based LANs, but with varying degrees of reliability. At home, half of interviewees continue to rely on modems. Nearly all interviewees do their primary preparation for teaching at home, and, with two exceptions, each provides the technical support for her/his computers at school. All have been using the Internet for personal or professional uses for nearly 10 years. Half of interviewees use the Macintosh OS, while others used mostly Windows XP, but have machines available in their classrooms, labs, or libraries with Windows 98, NT, and 2000.

A number of common teacher concerns and conventions emerged from the interviews; in addition, some excellent and innovative teaching practices, and some fairly solid and predictable uses of technology, also emerged. What did not emerge were any notably innovative or radical uses of technology in the classroom or with students. We found that our interviewed teachers followed what can be characterized as standard scholarly research practices in pursuit of outcomes not typically identified with scholarly research; that is to say, rather than making use of gathered resources to write a scholarly paper or research report, they typically organized – most often in outline form – primary and supplementary resources on a day to day, week to week, or unit basis to support and enrich their classroom teaching

Below we list the most significant topics around which teacher practices, concerns and comments clustered. We also include representative comments from the teacher interview transcripts to illustrate these topics. The list has been organized around the concept a representative teacher's process as s/he works through the steps to prepare for a

classroom session: focusing on a framing question; gathering relevant source material; creating a lesson presentation; sharing this lesson during classroom delivery.

Begin With a Question: Three teachers reported that they begin their planning of a unit with a question; a question drives the teaching and learning, and that requires a process of discovery, synthesis, and conclusion. Curriculum built from a question, and sub-questions, more naturally drives the kinds of resources needed and the kinds of activities in which the students will engage.

Teacher Content Knowledge: Most teachers mentioned the web as a source for their own content knowledge, often for quick updates and brief bits of information, especially when teaching a subject with which they may not be completely familiar. It is not uncommon for teachers to be asked to teach subjects other than their specialty, or to return to teaching a subject having not taught it for several years.

Michelle related a recent experience: *Much like the electoral maps for government class... there was some stuff I needed to know on hedge funds, and I really didn't understand it, so I went to the Internet and found something rather quickly. I used to not really want to go away from paper, but it's just so much more efficient than going to the library or looking for books, especially when you want to look up a topic like hedge funds.*

Ed and Rob both talked about limitations in relying only on books as a source.

Rob: *"I don't really like the stuff created by text book companies. They are good at creating the high and low end, they lack in the middle level. They (his students) don't read well but they have good critical thinking skills. Sometimes I might adapt, sometimes I start from scratch."*

He pays for the copies he makes because the copier at school often doesn't work.

Identifying Usable Resources: In general, teachers have a number of reasons to seek new, usable resources: previous examples or material did not work in class; the resources in hand or previously used are now outdated; teachers want resources to support additional classroom activities and improve outcomes; teachers are teaching a class or subject for the first time.

Bob remarked: *" . . . so I am going to take a look at what I did the year before, and the whole overview of what I want to do, and so in regard to the specific content I'm doing, I want to see if there's new information available, and see if there's other resources that I haven't used that are out there, I'm especially interested in other activities that I could do."*

All subjects stressed the importance of *ease* in finding digital resources. However, ease in finding resources meant several things: for some users, ease was achieved after past experience had narrowed search practices to familiar sites with consistently reliable materials; for others, an easy process of searching for and identifying resources was

paramount; some defined ease more in terms of how materials are presented or packaged; and some wanted easy ways to confirm that resources, once located, can be trusted.

Many teachers return to the same web sites for materials. For example, the teachers we interviewed are social studies teachers and nearly all of them identified <http://worldhistorymatters.org> as a site to which they return regularly. A short list of other sites frequently mentioned includes: the New York Times; Time Magazine; The Library of Congress' American Memory.

Bernie, on the World History Matters site: "I felt it met... some of the basic criteria, credibility that I was looking for... that it was affiliated with an actual university; that it's professionally designed and easily navigable; that it has an informal (not sure if it has a formal) association with the American Social History Project... It was clear that they (students) would likely actually find something there... some sources, and some links to follow. And also that it was clearly intended for teachers and students... Had ways of really creatively using those kinds of digital resources too... not just to present information, but as a resource for teachers of teaching strategies, as a resource for students for how to think historically and how to do historical research."

One teacher who teaches a psychology elective frequently uses materials from the American Psychological Association (APA), even though these often require a great deal of adaptation for use. He notes at length his frequent use of the APA site, in particular the fact that it's a trusted resource that links to additional trusted sites.

Bob mentions: [I return to] "a site that specializes, that really knows the content, so the many references, links, articles, etc., are trusted."

This teacher also receives APA emails and the magazine, indicating that some kind of notification system is important.

Noting the need for ease in the process of searching, the subjects often discussed the use of search engines. A desire for speedy response and uncluttered interfaces has led many users to become devoted Google users: keyword searches are pretty easy, users like being able to easily scan Google returns, and many mentioned using Google's image search function. Google's simplicity is appealing.

Teachers used various means for authenticating materials. They relied upon their own knowledge and used cues such as domain endings (.edu or .org), and whether the site had a clear sense of purpose and design.

Bernie: "The finding [of materials] is [the most] difficult. I feel like I have some strategies, and some sites I'm already familiar with, and some tools that have typically yielded pretty good results for me, and then sometimes I feel that sense of bewilderment of what's out there and what I'm missing and what I'm not familiar with and what's not connected to the links I'm already following..."

there's a frustration associated for me with not being able to make the information accessible to students in ways I think would be most useful for them.

How resources are presented or packaged was also important. For example, a web site that is too dense or crowded, difficult to read or scan, or tries to present too much material or go too deep into the content area, may not lend itself to ease of assessment and instructional adaptation (*i.e.* extraction for combining with other resources, or printing). When encountering resources new to the user it is important that the user can fairly rapidly assess the relevance of the material.

It is important that a site has some kind of information that confirms that its resources have been reviewed or curated, a means to verify reliability and trustworthiness of material.

Bernie: "I'm increasingly finding myself directing students to particular sites, like... I need to make a more comprehensive list. I have the beginnings of such a list, I haven't quite finished... all the starting places that I want to give them. But even this one site, History Matters, as a place to start where ...they're likely to find information on the topics we've [covered] in class... that's gone through at least some kind of review."

Teacher-Crafted Teaching Materials: All of the teachers interviewed emphasized that the majority of their teaching materials are found, assembled, organized, and delivered by them. The model resembles the *class reader* found in higher education, but is, as discussed by our teachers, assembled primarily for the teacher, and then presented to students who are guided through it by the teacher.

Michelle was asked: Do you look at lesson plans online, if so would you print them out?: *"I have done some of that, but mostly I look at some of the questions that I may use, but I have to generate things myself to be able to teach it."*

Bob: *"My philosophy is, I would never use, I would not often use what someone created without making it my own, without changing it to fit my own needs. I create a lot of my own curriculum; I cut my teeth that way. This is a whole other issue to talk about – it's the latest trend to use this scripted curriculum... I think the most enjoyable thing about teaching is to create your own curriculum... I have textbooks, but I use them to supplement."*

With the availability of supplementary material, sometimes more recent or accurate, textbooks may become the secondary material, with only the chapters judged useful by the teacher being used with students. Or the text might be used simply for homework.

The interviews did not find much sharing among teachers of resources or teacher-crafted teaching materials.

Bob: "I don't mind that (other people using my teaching materials), I'm going to tell you honestly. What I don't like is somebody using my materials because they're too lazy to think of their own. It's not because it's so great... nobody does it the same way... a lot of this job involves personality, what you bring to it... there's these intangibles... it's very important for teachers to be intelligent but, there's so much else, somebody could be very intelligent but somehow not communicate... it's great when teachers create stuff together, but that doesn't happen enough..."

Additionally, none of the subjects we interviewed was interested in most kinds of formal curriculum, including lessons plans. These types of curriculum packages do not appeal to most teachers because they must create or adapt pre-existent materials to various classroom populations with different reading levels, varied ages, backgrounds, and interactive dynamics, and the unpredictable topical influences of the day.

Subjects also emphasized the need for all packaged materials to be in manageable sizes: easy to scan, easy to make sense of immediately, to the point, able to be printed or to easily have sections lifted out (typically by copying and pasting). In this same vein, it was noted that teachers must constantly adapt all kinds of material for teaching contexts with variables: age, culture, reading level, topicality, opportunity for integration with other topics or subjects, etc..

Printing and Photocopying: The most common use, by far, that teachers make of digital texts and images found on the Internet, is to print or photocopy them. In many cases printed text or images are photocopied and distributed to students.

Michelle on whether she prints articles for distribution: "Absolutely, I used 22 articles for campaign 2004, mostly from the NY Times and Washington Post... Altogether, for example, for American Government, students read over 300 extra pieces not included in the textbook, and for U.S. History that's over 200. So there's a good balance between things that are text and things that are not."

If an entire article is printed a "print only" feature is desirable; if this feature is not available many teachers copy and paste text into a word processor for printing. The important issue seemed to be stripping out extraneous materials from the handout.

In some cases the file is saved to the computer; two veteran teachers, both frequent printers, print and do not save the resources, confident that they will find what they need next time.

One teacher sometimes prints on transparency for use on an overhead projector.

Bernie: I ended up reproducing on overhead transparencies and using them in class, and that was actually great – a high tech means of getting to the low tech thing with these overhead transparencies. We do have a few of these portable LCD projectors, and that's something that I would really be able to use more of–

to connect it to my computer in my classroom to get a much higher resolution image... It saved me. ...I also found all kinds of other interesting stuff that I was able to reproduce and use to supplement the things that I was originally looking for. For example, I found a picture of the button hook that the immigration inspectors on Ellis Island used to lift peoples eyelids up to check for a highly contagious disease that they were really concerned about not letting people into the country with. So, to be able to go to some of the stuff that I found online, images from Ellis Island from the Ellis Island Museum online, that was a treasure trove.”

Types of Materials and Frequency of Use: The subjects consistently referred to the use of four types of digital resources, which reflect, certainly the fact that they all teach social studies. These types are maps, political cartoons, historical images, and articles from newspapers and magazines. Several teachers used the term, “primary source materials,” a term well-used among middle and high school teachers, and which can often be found in even the most conventional teacher manuals for textbooks.

Teachers’ use of digital resources might be considered occasional to such an extent that to the outside observer their use may appear merely incidental. The use of, for example, two or three digital objects a week during instruction may not seem great, but the point is that the use of the materials is meaningful and accomplished or aided learning that might have been more difficult done another way. The one teacher we interviewed who prints 200-300 printed articles a year for advanced placement classes is exceptional.

Teacher use of digital resources may occur in bursts depending on when a lesson is taught and at what phase of a unit. A greater amount of variety of materials may be needed depending on the kind of activity taking place. For example, a whole class lecture, where attention is focused on a single topic, may require fewer materials than an activity where students divided into working or research groups are examining different sets of materials for different purposes.

The Use of Materials for Learning is a Social Endeavor: Several subjects spoke of how they prepare for an upcoming unit or lesson. Many have taught the same subjects for years, and know very well what it is they have to teach (standards) and what they want the students to learn (objectives). While materials may change over time, there really isn’t much day-to-day scavenging of materials – teachers know what they are going to do, and what they need to do it, days and weeks in advance. They are open to using new materials, but basically use what they have used before unless there is something about familiar material – outdated, didn’t work last time, difficult reading – that requires its replacement. For many teachers, however, what can really change through improvisation is the quality of teaching time in the classroom: the questions teachers and students ask; who works with whom; how an activity might successfully be pulled off.

Michelle: “*So I start with some readings that prompted questions, I write the questions, there’s articles that go with the questions, and this is a guiding outline*

for leading the discussion with students... and my method is, basically, Socratic. My course doesn't work if my students don't read."

The PowerPoint Question: The Alex Wright study presented to the California Digital Library during July, 2004, found near ubiquity of the use of PowerPoint. Our assessment did not find the same evidence. Of eight teachers interviewed only one uses PowerPoint. Furthermore, this teacher's use of PowerPoint must be characterized as atypical, unlike the well-known scripted backdrop for a lecture or presentation, and was in fact quite creative.

The teacher used PowerPoint to create slideshows as small repositories—texts, images, political cartoons, maps, etc., were stored in subject- and topic-specific slideshows, each independently titled with a clearly identifying name. These repositories were stored in a folder and could be easily retrieved to use each year. The slideshow is still the presentation format, but there is little or none of the formatting and style one finds in PowerPoint presentations, not even notes, captions, or annotations.

Poor Technology in Schools: Our interviews confirmed the generally poor state of classroom technology. Over the past 8-10 years, much technology has been purchased with grant money and other non-renewable funds. The *Digital High School* education technology grant program, passed in 1997 by the California State Legislature, allocated \$1 billion in grant money to California public high schools over a four-year period. The major part of technology put into place in high schools, especially in the early years of *Digital High School*, is aging and diminishing in usefulness. Compounding this situation, there are few funds today for the provision of technical support at the classroom level. School and classroom networks and connections cannot be maintained at the same high standards that are the norm in business and higher education.

Several subjects reported that in addition to poor technology in their schools, when computers functioned properly and network connections were available, searches that they or their students conducted were regularly blocked by filtering systems or firewalls installed on the network.

Classroom projectors are generally not available; in one district wall-mounted televisions fill this gap, in another, use of overhead projectors is the solution. But our teachers reported that these fill-the-gap solutions didn't always work, weren't always available to individual teachers, and were not uniformly available to the interviewed teachers.

Not Enough Computers in Schools: Uncertainty about the availability of computers (in classrooms and at home) plagued teachers' plans to embed technology requirements into lessons. Many classrooms lack an adequate number of computers for successful integration of digital curriculum. As a pedagogical issue, teachers remarked on the demanding challenge of integrating technology into a classroom with only five computers to serve 30 students. Coordinating access to a computer lab, where larger numbers of computers are often installed, further complicates planning for teachers. Related to this,

the question of whether or not students have library or home access turned requirements for student use of technology into an equity issue.

Conclusion and Analysis

Based on the findings described above we present the following preliminary suggestions for consideration during the continued development of user tools and interfaces that will enable better exposure and use of digital resources for K-12 teachers.

Appropriate Use: All of the teachers told interesting and impressive stories about their teaching and students. No one spoke about using technology because they had to, or simply for technology's sake. The examples they described were cases in which technology enhanced what they were doing and where the technology was appropriate, not invasive. All expressed an interest in doing more, but also questioned or wondered about the practicality of doing more because of various issues: student access and equity; the state of classroom equipment; a significant change in workflow effected by, for example, a flood of emails; and other institutional limitations such as school schedules, room size, or limited scheduled teacher prep time.

Teachers begin with questions: Experienced teachers approach lesson planning with a set of questions that narrowed their scope in searching for materials, and work to closely align materials with learning objectives. Sometimes the questions come from a response to the topic or standards, and sometimes the questions arise from encounters with new materials or information. This poses interesting organizational challenges that require further analysis and exploration, and experimentation.

This is not to say that all materials created for K-12 must begin with a strict set of questions; in some cases, that might effect the open-ended qualities that a collection of resources might have that are valuable to teachers. And this also does not mean that if one can identify the finite set of questions that teachers must address with their students then providers of materials for teachers can get busy creating those finite sets of materials to address those questions; topics change or need updating, and questions change. Instead, it should be clear to the creators of collections or teaching materials using digital resources, and to the teachers who use them, what kinds of questions these materials were asked before the gathering and presentation of these materials.

Teaching is improvised, finding materials is not: In preparing for teaching, teachers will continue to pull apart texts, curriculum, collections and other materials in order to adapt them to their specific style, teaching context or learning objective. It must be easy to extract sections and pieces from materials for reassembly in very low-tech ways, i.e., copy, paste, reformat in a word processing program. The improvisatory aspect of teaching is primarily centered in the activity of teaching in the classroom, and considerably less in terms of grab-and-go, last minute scavenging of materials. This means that experienced teachers have a very good idea of what they're going to do during each semester throughout the year – organized, for example, by an outline they have in mind, or drafted on paper, or from last year's syllabus; or in the order in which they have files saved in folders in a filing cabinet or on a computer. Teachers begin thinking about

and planning for the next unit weeks in advance, so they have time to search for, browse through, and select new materials and information for the next unit.

Curation: distillation and informed selection are essential: The abundance of materials available on the Internet makes the curation of materials an issue of the highest importance – teachers we interviewed reported feeling overwhelmed with “information” and would rather consult fewer web sites with reliable information that can be trusted for primary and secondary source materials. The role of a curator and designer appears to be becoming increasingly important. The curator or a curatorial team performs several functions:

- choose or identify a topic,
- create a narrow set of questions about the topic for which resources can be gathered,
- review and gather materials,
- reduce the materials to a focused and usable set,
- design, test, and produce a presentation environment
- secure a place to house the presentation environment
- train others to use it
- promote the resource

Loosely aggregated, “modular,” collections are more appealing and useful to teachers than comprehensive curriculum packages: Most teachers need to make time-consuming adaptations to curriculum packages to make them acceptable for their own use. This doesn’t mean that a loose collection of information will automatically be more useful; merely opening resources to the public and presenting materials with the expectation that they are attractive and stand on their own will not be successful. Our interviews indicate that well-designed, attractive collections of clearly contextualized resources reflecting a high quality of questioning, thinking, and analysis, presented by individuals or institutions with verifiable authority, will find far more use.

Usable design and presentation (low-clutter) is very important: It is important, especially when presented in the web environment, that the viewer can quickly grasp the sense of what is being presented. This doesn’t mean that materials need be shallow, and it doesn’t mean that a lot of flash and glitz must be used to get the user’s attention; American Memory and History Matters are examples of how to do it right. Another interesting source is Monitor on Psychology (<http://www.apa.org/monitor/>) and the collection of articles on sleep at (<http://www.apa.org/topics/topicsleep.html>). Clear and simple design with essential information to quickly orient the user will make materials easier to use. Lesson plans require time-consuming teacher adaptation; instead, small collections of related materials and outlines of approaches to materials and activities are far easier to use. Excessive collections of links are not usable. A good example of an outline approach directing use of a larger collection is at (<http://historymatters.gmu.edu/d/6875>).

Digital collections need contextual introduction: Collections of digital materials of any size need some kind of contextual introduction for users to quickly assess usefulness and trustworthiness of materials within. For example, such information as: Why were these materials collected together? What is intended by this collection? What kinds of

questions might they answer? What is the point of view with which these were assembled, and by whom, and for which institution or affiliation? What scope of understanding or discussion can these be used for? See (<http://historymatters.gmu.edu/d/6875>) for a good example.

Importance of printing: Printing is a primary way by which teachers share texts and images with students and with each other. A print-friendly version of texts is essential. This also of course means grayscale printing. The typical teacher will do little or no manipulation of the image before printing. Therefore a high quality image suitable to gray scale printing is desirable, and often in a format that will print well in the 8.5 x 11 format. In cases where images are being projected a projector view fitting the browser window is very useful.

Teachers are busy: The fact that teachers are busy is well known, but it bears frequent repeating and acknowledgment. The demands of teaching far exceed classroom hours. School and department meetings, various committees, student clubs, grading and testing periods, involvement in professional organizations, teacher mentoring, and other activities compete for the minimal preparation time that teachers have. Involving experienced, knowledgeable, and willing teachers in some capacity in the development of teaching materials, even in a casual consulting role, is essential, but requires working around teacher schedules, long-range planning, clarification of very specific roles, and attractive compensation.

The wired classroom and portable computers for all students and teachers remains a utopian idea: Early heavy investment in classroom technology has quickly dried up, and maintenance and replacement costs continue to rise. This increasingly pushes teachers to prepare for teaching at home, with reliable technology and fast internet connections, and then bring materials for classroom use in reliable, lower-tech approaches – printing, copying, distributing to the class, or else overhead or possible LCD projectors.

Little organized sharing of materials: While teachers do sometimes share teaching materials with each other, there is actually very little organized sharing, and time for sharing of teaching materials, or for collaboratively developing resources with each other, is hard to come by; school and departmental culture neither support nor encourage this practice. Any programmatic emphasis on developing communities of sharing, or a programmatic dependence on the voluntary development and sharing of teaching materials through networks of individual or collaborating teachers, is not likely to find extensive participation among teachers.

Appendix A



Letter of Introduction

November 2004

We work at University of California, Berkeley, at the Interactive University Project, part of Information Systems and Technology. We would like to invite you to participate in this research project, conducted primarily for the California Digital Library, also part of the University of California.

Our research involves a needs assessment with high school social studies teachers – and possibly librarians and other support staff – to better understand how teachers use information and materials from the Internet for their teaching. This research will contribute to the development of electronic resources, and tools to use those resources for teaching and learning. If you agree to participate, you will receive a \$50 dollar gift certificate for an online bookstore to thank you for your participation.

There are no foreseeable risks associated with your participation in this research, nor do we anticipate any direct benefits to you. We do hope that the research will benefit others by helping the CDL and Interactive University develop useful tools and services for teachers.

We will ask you several questions about this area. All of the information we obtain from you during the research will be kept confidential.

With your permission, the interview will be audio-taped and we will take notes during the interview. We will store tape recordings and notes about the interviews separately in locked file cabinets. Your name and other identifying information about you will not be used in any reports of the research. Only averages and descriptive statistics will be reported in any publication or report.

If you feel uncomfortable answering any questions, please let me/us know and we will gladly skip the question. If you have additional questions or comments, please call or email us: Isaac Mankita, 510-643-3954 or imankita@socrates.berkeley.edu; Chris Ashley, 510-643-2318 or cashley@berkeley.edu.

Thank you.

Interview Schedule , K-12 Teachers
Users' Needs Assessment

Demographics – Work History

First name: _____ Last Name: _____

Gender: _____ School: _____

1. What is your current position? _____
2. Grade(s) currently teaching: _____
3. Subjects currently teaching: _____, _____, _____
4. How long have you been a teacher? _____ (years)
5. How long have you been teaching social studies? _____ (years)
6. How long have you used computers to help you as a teacher? _____ (years)
(applications such as Word, Excel, grade-books, etc.)
7. How long have you used the internet for personal or professional use _____ (years)
(Email, WWW, google, ebay, amazon.com, etc)
8. Do you have a computer for your (teacher) use in your classroom? ___ yes ___ no
9. Who keeps the machine running? _____
10. Using a scale from 1 to 5, with 1 as “none of the time” and 5 as “all the time,” please complete the following statement: “My machine is available for my use _____”

| | | | | |
|------------------|---|---|---|-----------------|
| 1 | 2 | 3 | 4 | 5 |
| None of the time | | | | All of the time |

Comments:

11. Using (the same) scale from 1 to 5, with, 1 as “none of the time,” and 5 as “all the time,” please complete the following statement: My computer works properly _____”

| | | | | |
|------------------|---|---|---|-----------------|
| 1 | 2 | 3 | 4 | 5 |
| None of the time | | | | All of the time |

Comments:

12. Do you have a computer at home? ___ yes ___ no

13. Who keeps the machine running? _____

14. Using a scale from 1 to 5, with, 1 as “none of the time,” and 5 as “all the time,” please complete the following statement: “My machine is available for my use _____”

| | | | | |
|------------------|---|---|---|-----------------|
| 1 | 2 | 3 | 4 | 5 |
| None of the time | | | | All of the time |

Comments:

15. Using (the same) scale from 1 to 5, with, 1 as “none of the time,” and 5 as “all the time,” please complete the following statement: My computer works properly _____”

| | | | | |
|------------------|---|---|---|-----------------|
| 1 | 2 | 3 | 4 | 5 |
| None of the time | | | | All of the time |

Comments:

16. What platform/operating system is your “work” machine? (Windows ___ Mac ___)
Your “home” machine? (Windows ___ Mac ___)

17. Are your machines connected to the Internet? If yes, how fast is the connection? And for how long have you had each type of connection?

Work: ___ yes ___ no. Type of connection: _____ for _____ mos/yrs
Home: ___ yes ___ no. Type of connection: _____ for _____ mos/yrs

18. Where do you primarily do your preparation for work/teaching? ___ home ___ work

Teaching Practice(s), Workflow

1. Do you use materials other than the textbook for your teaching?
2. Where do you get these materials ?
3. How do you use them in your teaching?
4. Do you present these materials to students,? If yes, how?
(e.g. show in class, Powerpoint Presentation, Overhead Films, Slides, Online, print copies, others?)
5. Tell us about how you prepare yourself (and your materials) for teaching a specific unit or lesson. Pick an example from a unit or lesson that is coming up for one of your classes.

Probe:

Beginning

- How do you begin this preparation process?
- Do you look through the textbook?
- Do you review the standards?

About a Plan:

- Do you follow a “lesson plan?”
- How do you come up with these “lesson plans?”
 - If you use a “lesson plan,” do you follow the plan verbatim?
- Do you pick and choose pieces?
- → If Yes, what criteria do you use to pick-and-choose pieces?
- Can you “take” pieces apart easily? How do you do that?

Content Knowledge

- How do you refresh your knowledge about the topic or theme?
- What types of reference sources do you prefer? (print, online?)
 - If online, which sites do you consult more often?
 - If print, what titles do you prefer? (Encyclopedias, primary and/or secondary sources, other?)
- Do you check/consult with your colleagues?
- Do you check/consult with a librarian? (At your school, your community, local college / university?)

Supplementary Materials

- Where do you find supplementary materials to use in your teaching?
- How do you go about finding these materials?
- In what “form” do you generally find supplementary materials?
- What do you do with these materials?
 1. Do you organize them?
 2. How do you save them?
 3. Where do you save them?
 4. How do you find them afterwards – following week, next year, etc.
- Of these things you do – find, organize, save, and find them again – which are the more difficult? Why?
- Would you re-use these materials (another period, another school-year...?)
- Would you share these materials with others – teachers in your school, district?

6. Can you give us an example when you couldn't teach the lesson the way you wanted because of technology issues...?

NOTE: → Use the same probing strategy developed above. Briefly...

- The preparation process
- Putting together a plan for the lesson/unit
- Refreshing content knowledge
- Finding supplementary materials
- Using supplementary materials during teaching
- Finding supplementary materials again for a future assignments/use

7. What would make using digital resources in your teaching easier for you?

8. In the future, do you think y our use of online resources will increase, decrease or stay the same? Why?

This concludes our questions. Thank you for your time.

9. Do you have any questions or comments about what we discussed?