

USE and USERS of Digital Resources

A survey explored scholars' attitudes about educational technology environments in the humanities

By **Diane Harley**

Human-centered design, human-computer interaction, participatory design, and the ubiquitous ethnographic study are deeply embedded in the vernacular of technology developers and IT support personnel.¹ In the academic world, researchers hope increased knowledge about “users in the wild” will result in the design of more useful and usable technology-enhanced teaching and learning environments.² Ongoing research at the University of California, Berkeley, into faculty behavior and attitudes suggests a possible chasm between what productive and creative scholars say they need, on the one hand, and what many technological enthusiasts envision on the other. Indeed, “the lack of faculty willingness to change” is often cited as a key barrier to wider adoption of a variety of technologies in undergraduate teaching and other forms of scholarship.

Our experience with faculty needs and attitudes raises the question, do many “producers” of technological tools and systems pay much attention to the unconvinced, indifferent, tired, frustrated, or thwarted academic “consumers”? Or do they simply dismiss many nonadopters as aberrations, luddites, or dinosaurs, with little reflection about the complex reasons why many scholars have not yet embraced the promise of the “new, new” technological thing?

This article draws on an in-depth study of humanities and social science (H/SS) faculty and their attitudes about use and nonuse of digital resources in teaching undergraduates. The purpose of the research was to map the universe of digital resources available to undergraduate educators in a subset of users in H/SS and to examine how understanding use, users, and nonusers might benefit the integration of these resources into scholarly environments.

It is generally agreed that humanists and social scientists will depend on complex media tools to realize the full potential of digital resources in their teaching and research,³ but this shift has not yet been fully realized.⁴ The overall context of studying H/SS users in higher education is immense and complicated, however. The available, and often overlapping, perspectives span professional societies, libraries, instructional/educational technology, pedagogical research, and distance education. One rationale for this study was to identify the special needs of H/SS scholars, particularly as they relate to the future of liberal arts education in a digital age.

A disaggregation of users by discipline and institution type can provide important knowledge to those who want to adapt the design of technological tools and systems to the full variety of user needs. The value of this perspective is that we are not advocating any particu-



lar position on what faculty “should” do in their teaching practice. Rather, as researchers, we want to challenge some of the rhetoric surrounding new technologies by exposing the myriad and complex reasons that actually drive faculty adoption of technological innovations in teaching contexts. We hope that information and education technology professionals will integrate this and similar research into their current practices and future strategic planning.

Methods

My colleagues and I employed multiple methods and empirical data to investigate how, or even if, H/SS faculty use digital resources in undergraduate teaching environments. Our definition of digital resources is intentionally broad and includes rich media objects (maps, video, images, simulations, and so forth) as well as text. These digital resources may reside in or outside digital libraries and include those developed by indi-

vidual scholars and by other entities.

We held discussion groups and conducted a survey of full-time and part-time faculty and graduate students among diverse higher education communities: California research universities (UCs), liberal arts colleges, and community colleges. We hosted four sessions of discussion groups with 31 instructors from three institutions.⁵ The discussions informed the development and creation of the faculty survey instrument. (We also held discussion groups and interviews with Web-site owners, use researchers, digital librarians, and educational technology professionals; those data and analyses are covered in the final report.)

To elicit responses that were as unbiased as possible, we assiduously avoided judgments about the “value” of specific resources in discussion groups and surveys. Instead, we asked instructors to tell us what resources they found more and less useful, why or why not, and for what purposes. The survey instrument delved into eight domains:

- Teaching background
- Types and sources of digital resources used
- Personal digital collections
- How digital resources are used in teaching
- Motivations for using digital resources
- Motivations for not using digital resources
- Barriers to use and frustrations
- Support and assistance needs

The survey, conducted in 2004 and early 2005, targeted 4,443 faculty from specific disciplines at a stratified random sample of community colleges, UC campuses, and liberal arts colleges in California; the survey was administered both online and on paper.⁶ We received 831 valid responses (a response rate of slightly less than 19 percent) to the large faculty survey. A follow-up telephone survey of selected nonresponders found no convincing evidence of response bias

Table 1**Demographics of Faculty Survey Respondents**

	Total	University of California	Liberal Arts Colleges	Community Colleges
Full-time	78%	86%	88%	56%
Part-time	22%	14%	12%	44%
Highest degree:				
AA	0.1%	0%	0%	0.6%
BA	2.4%	1.7%	1.2%	5.0%
MA	26%	11%	11%	71%
PhD	69%	86%	87%	19%
MD	0.5%	0.2%	1.2%	1.1%
JD	0.9%	0.8%	0%	1.7%
Other	0.4%	0.2%	0%	1.1%
Gender:				
Male	49%	55%	48%	34%
Female	51%	45%	52%	66%
Age (years):				
< 30	1.0%	0.9%	0%	1.7%
30–39	19%	18%	27%	16%
40–49	27%	29%	32%	19%
50–59	32%	33%	28%	32%
60–69	18%	17%	12%	25%
70 +	3.4%	2.8%	1.2%	6.3%
Discipline:				
Anthropology and archaeology	8%	8%	8%	5%
Art and architecture	12%	11%	12%	15%
History	12%	13%	18%	8%
Political science	11%	12%	19%	4%
Writing	4%	4%	3%	3%
Foreign language	11%	12%	10%	11%
Literature and English	28%	25%	24%	40%
Geography	2%	3%	0%	2%
Ethnic, gender, and cultural studies	3%	4%	2%	1%
Media studies and communications	2%	1%	2%	2%
Other	4%	4%	0%	5%

in the survey. Demographic data appear in Table 1.

We also conducted a second, parallel survey of instructors from a broader range of institutions, disciplines, and geographic areas, recruited through online discussion groups (with the survey posted on listservs); we received 452 responses. The results from this second survey corresponded closely with the main faculty survey on most dimensions. We did not validate faculty perceptions (that is, investigate whether a particular resource was or was not available at an institution). Nor did our analysis allow a fine-grained determination of the percentage of faculty who said they used resources but subsequently rejected using them because of dissatisfaction.

Extensive quotes from faculty in this article are representative of the many voices we heard. They also contribute to a compelling narrative.

Faculty Survey Results

The results of the survey are broken down into types of users, the digital resources used and why faculty use them, the importance of faculty's personal "collections," and why faculty choose not to use digital resources.

User Types

The degree to which personal teaching style and philosophy influence resource use was striking in faculty responses. The broad spectrum of user types ranged from the nonuser and the inexperienced/novice user to the highly proficient, advanced user of digital resources.

Nonusers were themselves diverse. They included those who were passionately opposed to the use of technologies in their classroom for a variety of valid pedagogical reasons. They also included self-described enthusiasts frustrated by technical and nontechnical barriers, and those simply without time to think about, let alone use, technology in teaching.

Digital Resources Faculty Use, and Why

Respondents used an exceptionally wide range of resource types, many not

Table 2

Types of Digital Resources Used

How often do you use the following types of digital resources in your undergraduate teaching?	Total (N = 831)	University of California (N = 522)	Liberal Arts Colleges (N = 90)	Community Colleges (N = 206)
Images or visual materials	75%	72%	71%	80%
News or other media sources and archives	64%	55%	74%	81%
Portals that provide links or URLs relevant to particular disciplinary topics	63%	61%	68%	66%
Online reference resources	62%	57%	67%	72%
Digital film or video	62%	57%	66%	72%
Maps	53%	52%	53%	51%
Online or digitized documents	50%	52%	60%	43%
Audio materials	46%	41%	46%	54%
Curricular materials and Web sites created by other faculty and/or other institutions	35%	32%	36%	43%
Digital readers or coursepacks	30%	29%	59%	20%
Online class discussions	28%	29%	30%	27%
Government documents	27%	23%	38%	35%
Data archives	27%	24%	27%	31%
Digital facsimiles of ancient or historical manuscripts	23%	24%	19%	20%
Simulations or animations	19%	15%	17%	29%
Personal online diaries (blogs)	9%	7%	8%	12%

“educational” in origin; see Table 2.⁷ Faculty in different disciplines require different types of resources, and they use them in different ways and for different reasons. A faculty member’s own “collection” of digital resources was the second most frequent source of material; Google-type searches were the first.

Instructors who use digital resources do so for a variety of reasons. The most frequently cited were integrating primary source material into the course, improving students’ learning, providing students a context for a topic, getting students excited about a topic, allowing faculty to do new things in the classroom, and obtaining resources not available at their institution. Other motivations included convenience and time savings (for themselves or their students), access to materials or teaching methods that would otherwise be unavailable, and pressure from students, colleagues, or administrators.

Several faculty explained their reasoning as follows:

It makes my course fresh and allows me flexibility in my teaching and keeps me current on topics and resources. Students love it!

—English instructor,
community college

The availability of primary sources has been crucial for the success of my teaching in history. Students have remarked what a difference it has made, and I have noticed a big difference between this course with the availability of online primary sources to those I have taught before that were based on printed resources.

—History instructor, UC

Classes held in immersive virtual reality projection settings such as “portals” and “caves” are especially

useful for teaching students about architectural environments.

—Architecture instructor, UC

The Importance of Personal Collections

The large majority of faculty (69 percent) reported that they use resources from their own collections. The use of personal collections is fairly heavy across all disciplines. In discussion groups and open-ended survey responses, faculty discussed a variety of reasons for maintaining such collections. The most important was the need to annotate, manipulate, and organize the various resources and to present them in context within the course. For faculty who rely heavily on primary sources, existing items culled from other sources may be the most valuable. Even for these instructors, however, their individual annotations and organization may be the “added value” that makes the personal collection worthwhile.

Table 3

Motivations for Not Using Digital Resources

I don't use digital resources in certain teaching situations because...	Total (N = 831)	University of California (N = 522)	Liberal Arts Colleges (N = 90)	Community Colleges (N = 206)
They cannot substitute for the teaching approaches I use.	75%	78%	81%	66%
I don't have time to use digital resources.	66%	67%	72%	61%
Using them distracts from the core goals of my teaching.	47%	49%	59%	34%
I don't want my students to copy or plagiarize material from the Web.	33%	35%	21%	34%
They are irrelevant to my field.	30%	30%	38%	28%
Students don't have the information literacy skills to assess the credibility of digital resources.	29%	25%	27%	39%
Digital material can be presented outside its original context.	25%	24%	19%	31%

One faculty member described reasons for creating his own digital resources:

I personally create essentially all the digital materials that I use for my classes. I have not done much about integrating related materials created by others. I should probably do that, but time is short and I am lazy. It would probably take as much time to wade through others' work finding what is useful and how to adapt it than it is to make my own, which I know addresses my needs.

—Linguistics and foreign language instructor, UC

Several explained the challenges of integrating personal resources into new media:

I own a personal collection of 40,000 35-mm slides, so to put it mildly, I am very invested in 20th century technology. I would need real help—both in machines and time—to convert teaching to PowerPoint, although I see some of its genuine advantages.

—Architecture and geography instructor, UC

I would really need a full-time visual resources person to convert, label,

and store in an accessible way the thousands of slides in my own teaching collection.

—Art history instructor,
liberal arts college

Why Faculty Do Not Use Digital Resources

The foremost reason for *not* using digital resources was that they simply did not support faculty's teaching approaches. Lack of time was a major constraint, regardless of institution. It was not easy for most respondents to use the plethora of digital resources available to them. Faculty—including those active and enthusiastic in their use of digital resources—identified many obstacles to using these resources for teaching, including finding, managing, maintaining, and reusing them in new contexts. One of the most-cited obstacles was the availability, reliability, and expense of the necessary equipment, both in the classroom and for personal use.

Reasons for Non-Use. We asked two sets of questions to assess reasons for non-use and barriers to use of digital resources: why faculty *do not* use resources, and *the barriers to using* such resources.

Table 3 illustrates responses to the question "How much do you agree or

disagree with the following statements about your reasons for not using digital resources?" Most faculty (75 percent) simply did not see a match between using digital resources and their preferred approaches to teaching. Several instructors elaborated on this motivation for not using resources:

Given a teaching style and materials that require one-on-one and/or group discussions regularly...the computer is a poor substitute for being in a classroom where ideas bong off of each other and where we "talk" as people to people, where I can see body language, and where I can manage the flow.

—Literature instructor, UC

I think there is a real danger of students' becoming too computer literate and "connected" in ways that undermine, or at least compete with, other crucial skills: argumentative writing, careful and critical reading of long texts, and oral argument.

—Political science instructor, UC

My courses do not lend themselves readily to digital resources.... Any hope of conversation with the students about the material

disappears; class becomes another television show for them.

—Foreign language and literature instructor, UC

There is evidence that PowerPoint and those other displays with bells and whistles etc. rot the mind. My students need to learn how to THINK and to READ BOOKS and, in the case of foreign languages, talk to real people. Their attention span is being annihilated enough with the huge number of “technical events” on television.

—Foreign language and literature instructor, UC

I find digital technology inherently alienating and a distraction from the sense of human community and interpersonal communication I try to create.

—Writing and art instructor, UC

Frankly, I just don’t really want to use digital resources. What’s wrong with books anyway?

—History instructor, UC

A simple lack of time was a constraint on everyone, regardless of institution:

I came across an adage that “e-mail allows me to do in one hour what I never had to do before.” So it goes with course WWW sites and digital instructional media too.

—Art history instructor, UC

I am excited about the possibilities here to truly enhance teaching. For me the primary stumbling block is in having the time to explore and evaluate sources, not a lack of sources or a lack of belief that quality resources are out there.

—English and writing instructor, community college

I have not devoted enough time to finding out what is out there. I feel like I need a sabbatical just to learn to make efficient use of digital matter.

—History instructor, liberal arts college

The reliability of digital content was a source of concern raised in the faculty discussion groups. Some participants felt a growing pressure to teach “Web literacy” to undergraduates so that students could better evaluate the credibility of digital resources. In addition to use of digital collections, some faculty members had specific concerns about how students used search engines for course-related research, suggesting that Web searching in particular had the possibility of eroding “good” learning—search engine results decontextualize information by retrieving an orphaned page that lacks the context of the originating site. Two instructors expressed their concerns:

Plagiarism with online resources is a real problem. In addition, they all seem to believe that everything they find on the Web is absolutely true, and they have no interest in, or ability to, determine the credibility of various sources found on the Web.

—Political science instructor, UC

Access to the Web initially diminished my students’ abilities as researchers—they substituted it for better print material—but this is slowly beginning to change. It remains an enormous issue, however, in relation to plagiarism.

—Architecture instructor, UC

Survey results nonetheless suggested that relatively fewer faculty have serious concerns about copying, plagiarism, and students’ information literacy skills than we expected. Concerns about information literacy were more of a concern in community colleges than in the UCs or liberal arts colleges, however (39 percent versus 25 percent).

Most of my students appear not to have learned how to do a good job of basic library research. I feel that should be a skill to be developed before others.

—Anthropology instructor, community college

Discussion groups and survey respondents also suggested that many faculty were jaded about keeping up with the “new, new thing.” They were apprehensive about investing time in learning how to use new tools (they did not want to be beta testers) and felt that valuable time was wasted on technical development projects that had limited functionality and usability. Several elaborated:

I once did a project on automating foreign language grammar drills and it turned into an ENORMOUS waste of time. It is hard enough to get my research done; I do not have the time to really work up new skills in this area.

—Foreign language and literature instructor, UC

The technological environment has changed so rapidly on campus that it is very difficult to reuse materials without a great deal of very tedious reformatting.

—Foreign language and literature instructor, UC

Barriers to Faculty Use of Resources.

Faculty, including those active and enthusiastic in their use of digital resources, identified many obstacles to using these resources for teaching. They were unsatisfied both with their ability to find the resources they need and with the tools available to manage those digital resources in different contexts. Table 4 lists the barriers to faculty use of digital resources. Respondents were asked how they agreed or disagreed with the statements noted in the table.

One instructor felt particularly frustrated:

As an art historian, I’d love to use more digital resources in teaching—especially as more and more interactive digital reconstructions of ancient and medieval monuments become available. However, I cannot afford to upgrade my computer and equipment on my own.... My answers on this survey will probably look very strange; it’s because I am totally gung-ho about using digital

Table 4

Barriers to Digital Resource Use

I have difficulty using digital resources the way I would like because...	Total (N = 831)	University of California (N = 522)	Liberal Arts Colleges (N = 90)	Community Colleges (N = 206)
I don't have reliable access to physical resources in my classroom(s).	53%	52%	43%	63%
The digital resources are distributed in so many places that it is difficult for me to organize them for use in my teaching.	45%	43%	56%	46%
There are too many resources out there for me to take advantage of—I am overwhelmed.	44%	42%	51%	47%
I don't have time to assess the credibility of the available resources.	43%	42%	48%	44%
The content I need or want is just not available online.	41%	47%	48%	25%
The academic quality of available materials is too poor to meet my needs.	39%	45%	40%	24%
I don't have reliable access to scanners.	39%	40%	34%	39%
I don't know how to locate the online materials I need.	36%	33%	43%	40%
I don't know how to save presentations to my computer so they can be run without a live connection.	35%	35%	35%	36%
Available software is unsuitable for integrating audio or video into my course.	34%	31%	40%	40%
Search engines provide irrelevant results for my needs.	34%	31%	35%	39%
I have difficulty understanding the issues surrounding copyright and digital collections.	33%	33%	33%	34%
My students don't have a high-speed connection.	32%	28%	13%	54%
Course management software packages are inadequate for my needs.	32%	32%	41%	29%
Web sites I would use are unreliable, and I can't count on them being there when I need them.	32%	30%	39%	33%
Available software is unsuitable for viewing and displaying digital images.	31%	29%	39%	31%
My students don't have reliable access to computers.	30%	24%	10%	54%
Web formats allow me to link to whole documents but not to specific excerpts within a text.	28%	28%	21%	32%
It is difficult to get server space or access to a server in order to store/host digital resources for teaching.	27%	23%	21%	38%
I don't have reliable access to a high-speed connection.	21%	19%	15%	32%
I don't have reliable access to a computer.	13%	10%	11%	21%

resources but have not had the opportunity to use them in the way I'd like to!

—Art history instructor, UC

The most-cited obstacles to the effective use of digital resources were the availability, reliability, and expense of

the necessary equipment in the classroom. Two faculty explained their reluctance to use technology in the classroom:

I find that the computer in class anchors me to a certain spot and at times to a certain order of

presentation. I need freedom to improvise, change direction, and physically move around.... Finally, I hate the tension that equipment introduces into the classroom, the fear of breakdown, the suspense, the frequent waste of time....

—English instructor, UC

The physical teaching facility is a big issue. I am currently carrying my laptop and projector from classroom to classroom and having to reconnect two or three times per teaching day. The rooms in which I teach have no online hook-ups, which is also a limitation. The physical burden of this technology can sometimes discourage me from using it.

—History instructor,
community college

In some cases, faculty were in a continual state of cobbling together internal and external funds to support innovative work (finding the funds for a systems administrator of new servers, for example) because their institutions, although enthusiastic, could not provide the necessary resources:

My department's budget model dates back to the mimeograph; thus I must acquire my own computers, film scanner, flatbed scanner, printer, and software. Some devices come from my extramurally funded projects, but much is purchased out of pocket.

—Art history instructor, UC

Often we have money to buy gadgets, but no money for training or maintenance. That's the biggest problem.

—Literature and writing instructor,
community college

Keeping equipment up-to-date is not taken seriously by those with the funds.

—Anthropology instructor, UC

Other major obstacles included difficulty locating high-quality, pedagogically relevant materials from credible sources, and the sheer volume of available materials. Academic quality of materials was a concern for more UC (45 percent) and liberal arts faculty (40 percent) than community college faculty (24 percent). Forty-three percent of all faculty stated they did not have time to assess the credibility of available resources.



Some faculty in specialized fields found too little material (or none at all) that met their needs or applied to their subject. One explained, "African materials are largely underrepresented in digital resources," and another said bluntly, "There are very few digital images available...for 'nonwestern' fields in general."

Even when the materials were available, organizing and archiving them remained a challenge. "Gathering sources and materials for my students and researching information to meet departmental needs are easy enough tasks, but organizing it all is not," explained one instructor. Survey results suggest that copyright concerns are not a major barrier for most faculty; they were cited by only one-third of respondents.

Conclusion

Faculty from different disciplines and institutions often have different needs with regard to the types of resources they want and how they ultimately use resources in educational contexts. Many faculty want to build their own re-aggregated resources, using their own materials and mixing them with resources they have collected along the way. They are concerned about the significant inadequacy of the technologies available to them, first to manage the array of available resources, and then to integrate them into teaching practice in and out of the classroom.

Borgman's "Personal Digital Libraries"⁸ seem a far-away promise for these users. Moreover, both novices and advanced users face challenges when integrating digital resources into their teaching, although they experience somewhat different needs and barriers; thus, generic or specialized tools and/or support systems that are helpful to one group may not suit another.

Faculty use a variety of strategies for negotiating the digital morass. For most, the path of least resistance is the one usually taken—a Google search, a walk down the hall or an e-mail to a colleague, a visit to the Web site of a trusted archive, or a personal and eclectic collection of digital stuff. What is deemed "good enough" for users will depend on the problem at hand. A single individual may have different standards and strategies determined by the immediate objective, time constraints, budgets, personal and institutional equipment, and support staff, among other variables. For faculty who maintain personal digital collections for teaching, this wealth of material is off the radar of most institutional or commercial support providers, even though it represents a large percentage of what faculty value.

The fact that the most-cited reason for not using digital resources was that they simply do not mesh with faculty members' pedagogies is an important finding that has implications for those who want to increase technology adoption in the academy. Should faculty—who we can assume know more about teaching their subject than nonspecialists—shoehorn their approaches into a technical developer's ideas of what is valuable or what is the correct pedagogical approach?

Based on the survey results, which focus on what faculty said they value and need within complex academic environments, tools and resources developed to support what faculty want to accomplish in their scholarship will have the greatest likelihood of success. Our discussions with those responsible for designing new tools and systems,⁹ however, led us to conclude that producers may sometimes eschew results of user studies that run contrary

to their preconceived notions of the value of technology to scholarly practice. Put another way, what is the real value of “user” studies in complex academic contexts? Usability studies and testing of pedagogical applications in the classroom are clearly useful for site, tool, and content design, but they will not yield the kinds of data needed to assess user demand for the burgeoning array of tools and services available to scholars. Indeed, there are a number of very good studies of the former type.¹⁰ Unfortunately, they can tell us only about relatively enthusiastic users of a particular brand of tool or content, but nothing about whether that brand may be valued or usable by a wider potential audience operating in varied and complex educational contexts.

Finally, is it worth asking if the increasing focus on serving the needs of the technical proclivities of a new generation of “always on” students¹¹ will overshadow the needs of the disciplinary experts who will teach them? And, if so, might there be a negative impact on scholarly practice and the teaching mission of the academy in the long run?

We encourage those in the information and educational technology communities to have regular dialogues with the full range of faculty they wish to serve—not just those enthusiasts who come through the doors of a support center or attend a workshop. Listening to faculty in a variety of disciplines who possess a range of goals and technological adeptness could assist in targeting services and tools to the many academic subcultures that inhabit any academic environment. *e*

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are derived from the larger study.¹² Some of the discussion and conclusions were explored in an earlier paper published in *First Monday*.¹³

Endnotes

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ulty survey are available at <<http://cshe.berkeley.edu/research/digitalresourcestudy/surveyresults/>>.

7. Figures in Table 2 represent the percentage of respondents agreeing with the statement. For frequency scales (five-point scale), we coded responses of “sometimes” or greater as “yes”; for agreement scales (four-point scale; questions), we used “somewhat agree” and “strongly agree”; for importance scales (five-point scale), we used “somewhat important” or greater; for satisfaction scales (four-point scale; question), we used “somewhat satisfied” or “extremely satisfied.”
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