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# From Teacher to Learner to User: Developing a Digital Stewardship Pedagogy

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## ABSTRACT

Addressing how the education of library, archival, and museum professionals influences the ways in which practitioners incorporate technology into user service environments, this article focuses on digital stewardship as a developing pedagogy. Digital stewardship encompasses, but is not limited to, the creation, maintenance, preservation, dissemination, and exhibition of a trusted body of digital information for current and future use. Pedagogy in this emerging area offers opportunities for experimentation and innovation that should have an impact on the ability of practitioners to interact with users and on the ways that users can become involved with and integrated into the construction of digital stewardship activities. The authors explore how this pedagogy can be applied in the classroom, in the laboratory, and in internships.

## INTRODUCTION

As information professionals in cultural heritage institutions (libraries, archives, and museums) increasingly focus on issues relating to the long-term preservation of digital objects, one new area of practice that is beginning to consolidate is digital stewardship. We use the term *digital stewardship* throughout this article in preference to *digital curation* or *digital preservation* for reasons given later in the article. Broadly interpreted, digital stewardship encompasses the creation, maintenance, preservation, dissemination, and exhibition of trusted bodies of digital information for current and future use. Our current knowledge of digital stewardship still concentrates largely on the creation of durable digital objects and on their maintenance over time. We do not have sufficient understanding of

how these digital objects are likely to be used in the future, how users will require them to perform, and what infrastructure needs to be in place in cultural heritage institutions to ensure their usability in the future. Pedagogy in the area of digital stewardship offers opportunities for experimentation and innovation in the ways it will affect the ability of practitioners to interact with users, as well as on how users can become involved with and integrated into the construction of digital stewardship activities.

We offer a general and focused examination and analysis of current digital stewardship pedagogy and practice. By exploring the preservation climate through an environmental scan of courses in library and information science schools nationally and internationally, describing and analyzing current digital curation and stewardship courses and programs, and concentrating on how those programs anticipate, accommodate, and teach the management of user interaction with digital objects, we hope to build on previous research to further illuminate the prospects for this field.

We focus on one case study, the Digital Curriculum Laboratory, recently established at Simmons College in conjunction with a new curriculum in culture heritage informatics. We analyze the ways in which student experimentation with a digital cultural heritage curriculum in a Digital Curriculum Laboratory provide opportunities to reflect on the implications and consequences of experimental learning in this area. In particular, the issues of use and usability, within the curriculum and in the ways professionals translate this experience into practical interactions with users, offer questions and challenges.

### CURATION AND STEWARDSHIP: WHAT'S IN A NAME?

Issues surrounding the *care* and *preservation* of digital media have been discussed in the professional literature for over twenty-five years. "Digital media," once categorized as a type of "nonbook" media (see, e.g., Henderson & Henderson, 1991), have evolved to encompass a large percentage of what cultural heritage institutions collect. Articles and reports with a specific focus on digital media came into their own by the late 1980s. During that decade the work of the Committee on Preservation at the National Archives (National Archives and Records Service, 1984) and the formation of the Commission on Preservation and Access (CPA) in 1986 drew attention to the preservation needs of—and problems surrounding—digital media.

Also during the 1980s the library profession reconsidered its use of the terms *preservation* and *conservation*. Pamela Darling promoted the use of *preservation* to refer to broad-based administrative aspects of caring for collections and *conservation* for the physical care of collections (1981, 1985). In retrospect, the development of preservation administration as a field may have facilitated the ability of libraries and archives to steward their

emerging digital collections because of the variety of administrative activities that preservation encompasses. Digital preservation requires more of an infrastructure than does traditional preservation, because with digital texts there are not only the electronic texts created by one's own institution but also a world of digital texts beyond one's institution needing to be saved. Comprehensive analog preservation programs helped to shepherd digital programs.

If the literature of the 1980s contained a clarion call to action (e.g., CPA publications, Lynch & Brownrigg, 1986), articles in the 1990s addressed technological, strategic, and conceptual issues in more depth. Two seminal publications of the decade were "Understanding Electronic Incubula: A Framework for Research on Electronic Records" (Hedstrom, 1991) and "Preserving Digital Information: Report of the Task Force on Archiving of Digital Information" (Garrett & Waters, 1996). Other works of the 1990s to address conceptual and definitional uses were by Cloonan (1993), Conway (1996), and Smith (1999a, 1999b).

Today the environment in which we care for digital media is far more complex than it was even a decade ago. Changes in industries, such as publishing, in which many paper-based publications are giving way to digital ones; a rise in online education; the use of handheld devices for an expanding variety of information needs; and a rapid evolution in social networking are resulting in changes in cultural heritage institutions. Consequently, preservation is evolving too. Today curation and stewardship are integral to preservation. The terms *curation* and *stewardship* refer to the creation, collection, organization, dissemination, and preservation of digital objects. Curators have practiced these functions for millennia. In the digital milieu, however, there needs to be additional emphasis on the environment in which data are created, with significantly more attention required to the conditions of creation and the context in which they are created.

Digital curation begins before data are created by setting standards for planning data collection that results in "curation-ready" data—data that are in the best possible condition to ensure they can be maintained and used in the future. Digital curation emphasizes adding value to data sets, through things such as additional metadata or annotations, so they can be re-used. Digital curation involves a wide range of stakeholders cutting across disciplinary boundaries; as well as cultural heritage organizations such as libraries, archives and museums, it also involves funding agencies, government bodies, national data centers, institutional repositories and learned societies. (Harvey, 2010a, p. 99)

"Curation-ready" data needs further explanation. It is commonly recognized in digital preservation and curation circles that attention paid to putting digital objects in good shape at the start of their life will be well repaid in terms of making them significantly easier to curate later in their

life cycle. Actions to ensure this include using open file formats for data capture and storage, recording sufficient metadata at the time of data capture, meticulously identifying files, and applying a rigorous file-naming protocol that ensures each file is uniquely identified.<sup>1</sup> As two other researchers compellingly described it, “many research institutions . . . are assuming new roles and working with other campus units to engage in a variety of activities aimed at enhancing the persistence of valuable digital content, often from the outset of its creation” (Meyer, 2009, p. 5).

Digital information is now accessed and used in ways that physical objects never could be. By its nature digital information can be deconstructed, repurposed, reimagined, and constantly rebundled. The ways digital objects are searched for and used are constantly changing. They must, therefore, be understood within a social context. While the importance of context and the need to preserve it has always been emphasized in the practices of cultural heritage institutions, context arguably becomes even more significant for digital materials. Reasons for this lie in large part in the ease with which small chunks of data can be isolated and reused—the deconstruction and rebundling we refer to. This point is explicitly articulated in the Information Package concept in the OAIS Reference Model (ISO 14721:2003). This is a key digital curation standard which acknowledges that the digital object by itself is not sufficient but must be accompanied by various kinds of metadata that allow its expected users (“the Designated Community”) to understand it.

Though the terms *curation* and *stewardship* are used interchangeably, there are differences in their meanings. *Curator* is derived from Middle English and Old French for legal guardian or overseer, and means “to take care of.” *Steward* stems from the Old English and means “keeper” (*American Heritage Dictionary*, 2000). Stewards are also overseers, however, which suggests that stewardship signals broad cultural responsibility. Kevin Bradley (2007) defines stewardship as addressing the “cultural, public policy, and ethical questions about how and what we remember and forget,” and curation as “maintaining and adding value to a trusted body of digital information for current and future use.”

We have decided to use stewardship because it encompasses the full range of practices and issues with which curators and other professionals must be concerned. As so much of stewardship is the administration of collections, it is useful to see how the term is used in the management literature. Peter Block writes that “Stewardship is to hold something in trust for another. Historically, stewardship was a means to protect a kingdom while those rightfully in charge were away, or, more often, to govern for the sake of an underage king. The underage king for us is the next generation. We choose service over self-interest most powerfully when we build the capacity of the next generation to govern themselves” (Block, 1996, p. xx).

Or, framed to pertain to cultural heritage collections, we must build the capacity for the digital objects created today to survive and be usable in the future. In so doing, our “primary commitment is to the larger community” (Block, 1996, p. xxi).

Current thinking suggests that digital stewardship should be handled differently in cultural heritage management institutions because of the nature and characteristics of digital materials from other kinds of materials. The key assumption we usually make is that “digital is different.” However, is there more similarity between what are usually considered distinctly different sets of practices than we think? We can use the example of preservation to attempt to address the question “how different is digital preservation from ‘traditional’ preservation?” by taking basic preservation principles from the analog world and assessing the extent to which they apply in the digital world.

Current digital preservation practice is based on the assumption that digital materials are difficult to preserve because

- they exist in a large variety of types and representations, which quickly become obsolete;
- they are closely linked to specific software applications or hardware, which quickly becomes obsolete;
- they are easy to corrupt;
- they are generally poorly identified (with insufficient metadata);
- they require more frequent preservation attention than “traditional” materials;
- they often have many intellectual property rights issues that restrict our ability to preserve them;
- there is a lack of developed infrastructure to support digital preservation activities;
- any infrastructure that is present for digital preservation is not funded, so it is not sustainable; and
- we still do not know enough about how to do it.

Many of these assumptions are questionable. A preliminary comparison of analog and digital preservation practice, which looks only at the most obvious similarities, is presented in table 1, which indicates that there is much common ground.

If this comparison is correct, and there are so many significant common elements in practice, it appears that digital is not so different and there is a need to reassess digital preservation practice. It is very likely that we can improve the preservation aspects of our digital stewardship practice by adopting and adapting practices from our extensive analog preservation experience. For example, we might work on developing a set of universal preservation principles such as these:

Table 1. Similarities between analog and digital preservation practice

Analog Preservation	Digital Preservation
Obsolescence and degradation of artifacts are always with us	Obsolescence and degradation of artifacts are always with us
Ensuring the longevity of the information content stored in artifacts	Protect data; Maintain ongoing access to digital materials despite technological change
Creation of "preservation-friendly" artifacts	Negotiate with the creators of material to use open, well-supported standard formats for which access tools may remain available
Ensuring the longevity of artifacts	
Redundancy—multiple copies are also a good thing (The Jeffersonian view that inspired the creators of LOCKSS/CLOCKSS)	Provide adequate data backups and create multiple copies; Multiple copies/redundancy
Security and emergency management	Have disaster recovery contingencies in place
Improving storage environment and maintaining it at controlled levels; Prolonging the life of the artifact through preventive action	Provide stable, secure media storage conditions and proper handling
Reformatting (converting the information to a more stable form); Replacing deteriorated artifacts	Copy data to new media well within the expected media life, and check the accuracy of copying
Careful documentation of the condition of the artifact and of procedures and materials used in treatment	Gather sufficient metadata about the material's technical characteristics and requirements to support its preservation and management; Description and representation information; Enhance the metadata
Ongoing policy and procedures review	Monitor the technological environment for signs that formats etc are becoming obsolete; Monitor for evolving solutions; Preservation planning
Protecting artifacts	Maintain adequate data security and protection from viruses, system attack and unauthorized modification of data
Stabilization of artifacts	Limit the range of formats to be managed
Appraisal	Appraise/Select
Collaboration	Work with or seek help from others to develop solutions; Community watch and participation; Interoperability: "you are not alone"
Keep the original—we keep the original after we reformat it (for example, retain the artifact after digitizing)	Keep the original (bit-stream, analog after digitizing)
Encapsulation—we can enclose artifacts in protective material	Encapsulation (digital files—XML wrappers);
All copying introduces change which needs to be accommodated (for example, in reformatting we emphasize checking and validating of the copy)	Constantly check and validate, because all copying of data (such as migration) introduces change

Table 1. (*continued*)

Analog Preservation	Digital Preservation
Authenticity—we strive to maintain the authenticity of the artifact (although we acknowledge this isn't always possible) as a good thing	Decode to uncompressed and save as uncompressed (in addition to keeping the original)

*Note:* This table was developed for a presentation by Ross Harvey: "Doing Digital Preservation: Do We Have to Learn New Tricks?" Harvard University Library, April 27, 2009 (unpublished). It is based on a wide range of sources, in particular: Clifton (2005); Cloonan (2009); American Institute for Conservation of Historic and Artistic Works (1994); Digital Curation Centre (n.d.); European Confederation of Conservator-Restorators' Organisations (2002); InterPARES Project ([www.interpares.org](http://www.interpares.org)); Paradigm Project (2005–7); Ross (2007); Stewart (2000); and Wright (2008).

- Appraisal is both necessary (because of limited resources) and desirable (to ensure high quality preservation).
- Materials contain the seeds of their own destruction (inherent vice), so the key to understanding what preservation actions to take is in understanding their structure.
- A clear distinction must be made between artifacts and the information they carry, or between the containers and the content.
- Preservation actions that address large quantities of material over actions that focus on individual objects are preferred.
- Preservation actions must take into account the needs of the user.
- Preservation, as a key component in the sustainability of cultural property, is an imperative that transcends national borders and is essential for the maintenance and perpetuation of global cultural heritage.

These were some of the principles that guided our thinking about a digital cultural heritage curriculum and the role of an experimental virtual space. These universal principles inform preservation pedagogy and practice. Their international aspects suggest the need to include international standards, accords and treaties, and collaborative projects, such as UNESCO's Memory of the World, in any curriculum to encourage students to think about preservation in a global context.

### THE TEACHING OF DIGITAL STEWARDSHIP

That the field of digital stewardship is evolving is apparent in the wide range of curricular approaches that have been emerging. A 2004 curriculum study of LIS/IS schools in the United States and Canada (Bastian & Yakel, 2006) indicated that preservation was a well-established component in curricula that also included courses in rare books or archives. Designed specifically to track and assess the growth of archives curriculum in LIS/IS schools, the study examined curriculum at all schools that offered at least one archives course. Of the thirty-two programs examined in the

initial study, twenty-six also offered a preservation course. Aside from an introductory archives course and a practicum, preservation was the only constant regularly appearing throughout these programs. Few offered preservation beyond a general preservation management or introductory course, and only one program offered a digital preservation course.

A five-year update of this curriculum study, currently under way, indicates a similar prevalence of preservation courses and, in fact, an increase, as the number of archival programs has increased. Schools initially offering one preservation course are now offering several and have also added digital preservation and digital curation courses. Of the thirty-six schools offering archives programs, twenty-nine also offer preservation, and eleven hold courses in digital preservation. Significantly, several schools that do not have an archives program have also begun offering digital preservation courses. At the same time it must be noted that courses in digital preservation/curation/stewardship are somewhat of a moving target, not only in the ways and frequency in which they are offered, but in the ways they are named and presented in the curriculum. Courses in digital libraries, electronic records, and information media all contain elements of digital preservation.

There has been extensive research into the development of curriculum for digital libraries. One notable example is the NSF-funded work carried out during the Digital Library Curriculum Project by Virginia Tech and the University of North Carolina, Chapel Hill (<http://curriculum.dlib.vt.edu>) from 2006 to 2009. In such developmental work, digital preservation, curation, and stewardship typically receive only minor attention, with the notable exception of the DigCCurr Project (<http://ils.unc.edu/digccurr/>) at the University of North Carolina, Chapel Hill. This research has informed our activities in developing a digital stewardship pedagogy.

Examination of sample digital preservation syllabi revealed many common elements, as well as a number of individual perspectives, suggesting that, at this relatively early stage of curriculum development, some consensus was being reached within the profession. Discussion of the Open Archival Information System (OAIS) Reference Model, multiple formats, processes, and best practices were elements of all syllabi, but each employed a different set of readings. Thus it is clear that, although consensus may have been reached on some major topics, syllabi have not yet coalesced around any agreed core set of readings. Identifying a core literature is a crucial aspect of any developing discipline. This concern is currently being addressed by a subcommittee of the IDEA Working Group (International Digital Curation Education and Action) whose mission includes the development of an internationally shared digital curation curriculum (<http://ideaworkgroup.org/index.html>).<sup>2</sup> The increasingly global common ground in relation to digital preservation issues suggests



not only that a core literature is desirable but that it is achievable and could form the basis for a generally agreed curriculum.

Earlier in this article we noted why we decided to use the broader term *stewardship* rather than *curation* or *preservation*. Digital stewardship needs to be concerned with the broader issues that shape communities and should include a keen awareness of what users (the community) require or demand, as well as an appreciation of the historical influences of social and policy issues. On this basis, a digital stewardship course should pay significant attention to history (how have digital archives developed, and in what contexts?); context (social and policy issues play a large part here); content (the nature of the materials in digital archives and what should be in them); broad access issues and concerns (public information and public access and their evolving meanings, restricted access, embargos, intellectual property law); and organizational and management questions (with a strong focus on sustainability and planning for the future). Significant attention must also be paid to the management of digital objects over the long term through active, ongoing oversight of the total environment (content, technologies, and user expectations). Digital stewardship is necessarily also concerned with technical areas such as information structures, metadata, database technology, and technical processes.

Is this what is happening? Our analysis of available courses in digital preservation, curation, and stewardship, and offered in the United States, Canada, and Europe, based on documentation available on the Web in January and February 2010, suggests not. There are obvious limitations to this analysis: for example, only the brief paragraph descriptions given in course catalogs are available for many courses. We observe that there is variety in the content of the courses, undoubtedly a healthy characteristic, that fall under the broad umbrella of digital preservation, curation, and stewardship. Some courses focus on the processes of digitization, but most focus on the processes and technologies of digital preservation. Sustainability is usually cast in terms of files (types, formats) rather than organizations and infrastructure. Historical perspectives are implied in most of the courses but overtly articulated only in one. There is relatively little focus on users, although this is perhaps implied in mentions of appraisal and selection that occur infrequently.

The conclusions from our analysis are partially corroborated in Kaitlin Light Costello's analysis of the contents of digital preservation courses offered by the twenty-six schools in the iSchools Caucus (2010). Costello mapped the content of these courses against terms from the matrix of digital curation knowledge and competencies developed by the DigCCurr Project at the University of North Carolina at Chapel Hill (Lee, 2009). Specific concepts and competencies were most heavily represented: for instance, the terms that appeared most frequently in the Mandates, Values,

and Principles category were “Standardization,” “Authenticity,” and “Long-term” or “Long term” and “Trust.” Terms mentioned frequently in the Functions and Skills category were “Access,” “Administration,” “Management,” “Use, Re-use, and Adding Value,” “Selection and Appraisal,” and “Description, Organization, and Intellectual Control.” By contrast, Costello found no mention in the syllabi she examined of general terms such as “Diversity” and “Organizational Learning.” Although there are limitations of this analysis, as Costello indicates, the results are indicative and support our contention that insufficient attention is being paid to history, contexts, and users in the courses currently available.

All of this suggests that while many current courses may not yet have quite “got it right,” a number of viable models are developing. As detailed above, in a digital stewardship curriculum, content cannot be separated from context, and there must be a significant emphasis on the role of policies, the demands of social issues, and the requirements of user communities. Focusing on the technologies and processes without regard to the context does not fully present or address all aspects of this complex topic.

With the rapid shift to digital issues in all aspects of LIS/IS curricula, not only in the area of digital preservation, it is clear that a new pedagogy must accompany the many new and reconceptualized courses. Analog workspaces can no longer accommodate or satisfy students’ needs to understand or even fully comprehend the scope of these issues. Through a variety of grant initiatives, several LIS/IS programs are beginning to experiment with providing digital environments that complement classroom learning. The Digital Curriculum Laboratory currently under development at Simmons College as part of a wider Cultural Heritage Informatics curriculum is one such model.

### THE DIGITAL CULTURAL HERITAGE CURRICULUM

The Simmons Digital Curriculum Laboratory, as an example of an experimental digitally focused pedagogy, is also a key tool for incorporating a strong element of user interaction and its management into the school’s curriculum. This section explores the ways in which student experimentation with a digital cultural heritage curriculum, through the medium of a digital curriculum laboratory, provides opportunities for students to reflect on the implications and the consequences of experimental learning in this area.

In 2009 and 2010 Simmons College received support from the Institute of Museum and Library Services (IMLS) and the National Historical Publications and Records Commission (NHPRC) for the development of a Cultural Heritage Informatics curriculum specifically designed to address the digital convergence of cultural heritage institutions—libraries, archives, and museums. This initial curriculum includes three courses: the first, a general introduction to these cultural heritage institutions as well as the

issues posed by their convergence; the second, a course in digital stewardship designed to prepare students to recognize, analyze, and implement digital solutions to these issues; the third, an internship in partnership with seven cultural heritage institutions in New England, each of which will develop and pursue a convergence case study in conjunction with an internship team.

### *The Digital Curriculum Laboratory*

A key component in this curriculum is the Digital Curriculum Laboratory (DCL), the development of which is currently well under way. The DCL began life with the assistance of a small internal grant, the Pottruck Curriculum Technology Support Grant, which allowed us to carry out initial planning. Progress was significantly stimulated by the grants from IMLS<sup>3</sup> and the NHPRC.<sup>4</sup> The DCL will provide a virtual workspace in which students, educators, and other users can experiment—a laboratory in the scientific sense of a space for testing and exploring. We envisage the DCL as helping to educate students to be better decision makers within the context of digital cultural heritage. It will do this by providing hands-on experience with digital archival processes and procedures first to students and later to the archival education community. Such experience is essential for students entering the workplace. Internships, the traditional way in which hands-on experience has been provided, are not plentiful in digital areas, and, where they do exist, usually offer a limited range of experiences. A laboratory environment enables simulation of real-world experience in as many areas as the curriculum requires.

A significant obstacle to successful pedagogy in digital cultural heritage is the difficulty of acquiring large and representative amounts of nonproprietary digital content for student use. Such content is essential, but education programs do not typically collect and store this kind of content in the quantities required for teachers to offer their students realistic experiences. Another obstacle is the lack of a neutral virtual workspace in which students can experiment with applications and content types without the fear that they might cause damage. For these reasons, a virtual space where experimentation with a range of tools and content can occur and which complements classroom instruction is an essential component of the infrastructure for learning in digital cultural heritage. The DCL will be situated in a broader community—New England—that is rich in archival institutions with deep practical expertise and long histories of partnership and cooperation with the Graduate School of Library and Information Science at Simmons College.

The DCL has three principal components: digital content in a wide range of formats and types; software tools; and a workspace. Curriculum-specific scenarios will provide a device to integrate these into a structure in which users of the laboratory can experiment with and evaluate tools and standards for their relevance to the kinds of content specified in the

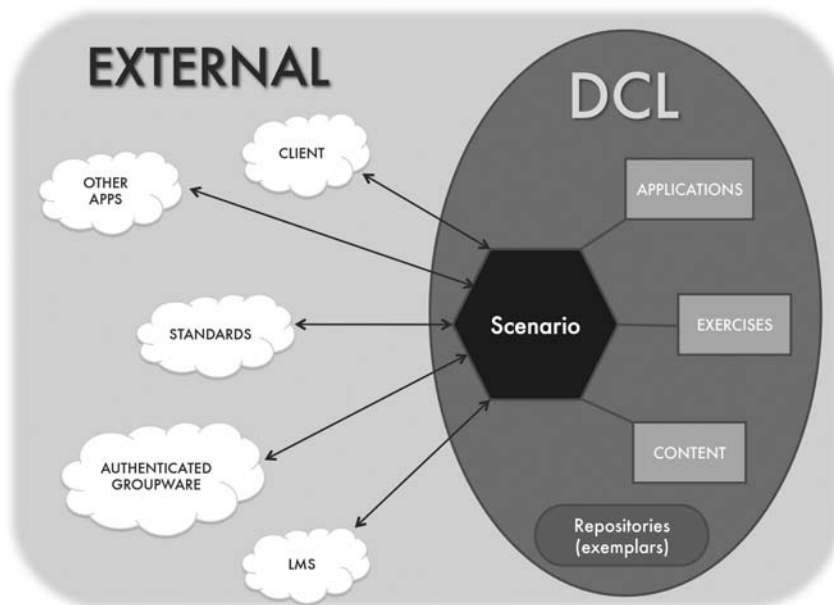


Figure 1. Simmons College Digital Curriculum Laboratory (<http://calliope.simmons.edu/dcl/lab>)

scenarios. A repository for exemplars, tutorials, and other course-specific materials will also be provided. This structure is represented graphically in the DCL Open Education Model.<sup>5</sup>

The instructional modules provide the mechanism that relates the content to the applications, allowing them to operate together to provide effective guided learning. At their heart are curriculum scenarios, developed both by the project team and by specialists in the topic they address. A scenario in electronic records management, for example, is being developed by a faculty member who teaches that course. At this developmental stage of the laboratory, scenarios may be based on the content and the tools provided by the DCL or may be drivers of what content and applications should be installed. The scenarios complement the classroom curriculum, serving as digital hands-on exercises within a particular course. They present a sequence of events and tasks within a specific context. For example, in a scenario in a digital preservation course, students are confronted with preserving various types of outdated media for which they must formulate a preservation plan, make a series of decisions, and perform particular operations. Students determine the actions required to address the scenario by engaging in activities such as problem solving, making choices, evaluation, and assessment, and by performing a series of processes. Each module also includes a workspace in which students

can interact and experiment. The workspace will be designed so it can be reset or archived periodically to make space for new users without compromising the integrity of the core collection of artifacts and software.

The DCL will contain primarily nonproprietary software and be developed on an open-source platform in keeping with best practice in digital preservation and cultural stewardship. This open-source emphasis is a key to the DCL's sustainability because it makes it more feasible to update on a continuing basis to accommodate new applications. Because the virtual world is constantly evolving, the DCL must be flexible enough to grow and change.

The DCL is, we believe, an exciting development that will enable Simmons College faculty to incorporate a strong element of user interaction and its management into their cultural heritage informatics curriculum. Evaluation and assessment are intrinsic to the DCL's development, and the results will inform the development of a wide range of ways to interact with users. Evaluation will include: student learning; the effectiveness of cyberlearning case studies, scenarios, and courses using the DCL; the suitability of competing digital asset management systems for specific digital content, audiences, standards, and Web usability; and competing standards for metadata. Methodologies that we expect to apply include a number of software tools that provide reporting and statistical analysis functions, Web metrics, and transaction log analysis. The Simmons College Usability Lab (n.d.) will also feature prominently in our investigations of the usability of the DCL and its component parts.

## CONCLUSION

In this article we have suggested that educators have an important role to play in the definition, framing, and practice of digital stewardship. There are many challenges to be faced in the emergence of any new area. We are addressing these challenges by developing new courses; establishing team-based internships in libraries, archives, and museums; and creating the Digital Curation Laboratory. In all of these endeavors, we are working closely with colleagues at other library and information science programs, as well as with librarians, archivists, and museum specialists. An area as rich and complex as digital stewardship invites a variety of collaborations.

We have defined stewardship so as to encompass technical, social, cultural, and political components. Chapter 2 of a recent report on conservation deals with values. The authors' descriptions of values and conservation align closely with what we call stewardship. In fact, one could easily substitute the word "stewardship" for "conservation" in the passage below:

Value is socially determined: an object, artefact or building can only have value insofar as people give it value. *Conservation* is therefore rooted in social action, and refers to the *management* of change in objects that have fluctuating value in the society in which they exist. . . .

*Conservation* is about refreshing and renewing culture and heritage in ways that reflect and contribute to society's values, thereby making a statement about value to others, and a statement about the present to the future. . . . At heart, *conservation* is a political act—it is a conversation between values. (Jones & Holden, 2008, p. 27; italics added).

“Refreshing and renewing” cultural heritage is at the heart of digital stewardship.

## NOTES

1. The concept is widely discussed in the digital preservation literature; examples include Harvey (2010b, especially chapter 9); Arms & Fleischhauer (2005); InterPARES Project (2007); Brown (2008); National Archives of Australia (2004); and UK Data Archive (2009).
2. Formed as a result of the growth of digital curation training and education globally, the IDEA Working Group seeks to coordinate digital curation education efforts, avoid duplication, and promote new initiatives.
3. Curriculum, Collaboration, Convergence, Capacity—Four Cs for the Development of Cultural Heritage Institutions: Grant Number: 113 2435 20 400129 (Simmons Graduate School of Library and Information Science, n.d.).
4. NHPRC Grant—Building a Simmons Archives Preservation Digital Curriculum Laboratory (Simmons Graduate School of Library and Information Science, n.d.).
5. The authors wish to thank Professor of Practice Martha Mahard, Assistant Dean Terry Plum, and student Kirstin Kay, all of Simmons College, for their contributions to the model.

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