University of Iowa Libraries Staff Publications

3-1-2001

Creating Partnerships in Support of Students' Scholarship: The Electronic Thesis and Dissertation Project at The University of Iowa

Janice Simmons-Welburn

Paul A. Soderdahl
University of Iowa

William Welburn

Creating Partnerships in Support of Students' Scholarship: The Electronic Thesis and Dissertation Project at The University of Iowa

Janice Simmons-Welburn, Paul Soderdahl, and William Welburn

Introduction

Theses and dissertations are the required evidence of scholarship or creative activity for graduate students. Realizing that much of what graduate students accomplish cannot be captured in a traditional print thesis or dissertation, the University of Iowa has joined many universities across the United States that are seeking ways of enabling students to use new media in their scholarship. Electronic Theses and Dissertations—or ETDs—hold great promise in providing students with options on how their work might be presented, archived and preserved, and made accessible to a much larger community of readers.

The University of Iowa Libraries and Graduate College have joined forces to plan, implement, and manage an ETD option for graduate students. This new partnership found a myriad of issues that challenge conventions in presentation, access, and preservation of research and creative work that are represented in the technology of communi-cating ideas, in policy, and in the interpersonal relationships between students and their faculty mentors. The presentation that follows will focus on the process of enabling graduate students to engage in an electronic presentation of their scholarship through a discussion of the organizational and technical aspects of Iowa's ETD option, and the issues and vision for the University Libraries.

Organizational Aspects of Creating an ETD Option

The thesis process fulfills two purposes. "It is an intensive, highly professional training experience…(and its) results constitute an original contribution to knowledge in the field."[1] It is more than coincidental that the University of Iowa would find it attractive to create an ETD option for its graduate students. In the 1930s, the university broke with academic tradition and began awarding Master of Fine Arts degrees for which students were able to submit creative work—a painting or sculpture, play, or collection of po-

---

Janice Simmons-Welburn is director, human resources and processing services, Paul Soderdahl is coordinator, information systems and technology, and William Welburn is assistant dean at the University of Iowa.

ems—in lieu of conventional theses describing the works and the act of their creation.[2]

New technologies now provide graduate students with an opportunity to present their scholarship utilizing video, audio, animation, simulations, and illustrations not available in a print environment. The benefits of an ETD include fostering creativity in scholarship, widely disseminating new knowledge produced by students, enabling students to learn to use digital resources, and increasing students' familiarity with electronic publishing. Beginning with the premise that an ETD would be an option rather than a requirement for graduate students, every effort has been made to commit to technology that enables students to fully embrace electronic publishing as a means of communication scholarship. Accordingly, the University chose to pursue Extensible Markup Language (XML)[3] as an extensible structure-based open standard for students to encode their documents.

At Iowa, ETD project partners are the Graduate College and the University Libraries, with support from the Office of the Vice President for Research, University Counsel, and Information Technology Services. All partners wish to preserve the integrity of the relationship between students and their faculty in the thesis process. By *integrity*, the ETD project at Iowa holds the view that writing a thesis is a learning process for students and their mentors. It is the beginning of students' involvement in scholarly communication or conveyance of creative ideas to a much larger audience.

The ETD implementation team has devoted energy to developing technical apparatus required for producing ETDs as well as access and preservation of works into perpetuity. These issues will be presented later; however, there also emerged several thorny policy issues that created an opportunity for a new organizational dynamic, that of collaboration over realized connections and overlapping policy questions.

The team first addressed a dizzying array of intellectual property issues involving both protection of property and fair use of copyrighted materials. As Kenneth Crews has advised dissertation authors, "Copyright law will become increasingly important in your academic, research, or business career; copyright is also crucial right now as you complete your dissertation…Copyright also imposes important responsibilities when you use the creative works of other authors."[4] These issues take on new meaning when related to electronic transmission of information via the Web. Research conducted by students and their mentors must be protected from copyright infringement. Policy had to be negotiated between the Office of Research, the Graduate College, and the University Libraries to protect sponsored research from the premature release of proprietary data and patent-pending results and to structure a mechanism for controlling the release of ETDs to protect students' future publication rights.

The ETD implementation team also found that students had to be more diligent about copyright infringement. Fair use as interpreted by some copyright holders changed when Web access meant that users from all over the world could download materials reproduced in students' ETDs. Students now frequently review their intent to reproduce copyrighted materials with university counsel prior to dissertation defenses and submission of final work to the Graduate College.

The ETD implementation team also examined how ETDs affected existing institutional policies and their protectors. Every effort was made to create a program that would not disrupt student-faculty mentor relationships. Eager graduate students must secure the corporate decision of their committees to permit them to move ahead with an electronic dissertation or thesis. The time-honored process of writing a thesis or dissertation—from initial proposal through defense and deposit in the graduate college and subsequent transfer to the university libraries—remains fundamentally unaltered.

In summary, the transformation from print only to an electronic option for thesis and dissertation creation and presentation has created an organizational process that revised—or at least reconsidered—routines and assembled organizational units within the university to work together to solve anticipated and unexpected problems. Endemic to universities is what organizational theorists view as the problem of fluid participation in decision-making.[5] However in this context, fluidity in decision-making enabled the process to call on individual and unit participation in decisions where and when appropriate, working toward the common goal of serving students.

Technological Implications

Because electronic publishing as a medium presents a new range of possibilities and challenges, the University of Iowa's ETD project team soon found that the relationship between technical decisions and policy issues is a dynamic one. When examining the various technical possibilities at several points along the way, the team regularly had to revisit existing policies and procedures to identify the "heart" of each prior to adopting a given technological solution.

One of the earliest decisions in the process was agreeing upon the format of ETDs, ranging from HyperText Markup Language (HTML) and Adobe's Portable Document Format (PDF) to accepting documents in whatever format the candidate was using to create the document (Microsoft Word, WordPerfect, LaTec, etc.). Libraries have traditionally endorsed the Standard Generalized Markup Language (SGML) as a common format for electronic text initiatives, often relying on standard encoding practices such as the guidelines set forth in the Text Encoding Initiative (TEI).[6] Because of its custodial responsibilities in perpetuity, it was important to the Libraries that the ETD format conforms to an open standard similar to SGML. Similarly, the Graduate College wanted to adopt a method that enforced conformance to certain structural elements that were deemed necessary to be consistent across all ETDs (such as title page elements, certificate of approval, and an ordered table of contents). At the same time, the College wished to provide graduate students with new capabilities for including video, audio, animations, and other media. With these requirements, XML soon became the obvious choice, providing the benefits of structural markup in an extensible environment.

Discussion quickly ensued as to what limits to impose on the amount of extensibility offered to graduate students. Following the model of relying upon open standards, it was agreed that candidates could include other text documents in XML format, as well as still images using JPEG compression and moving images using MPEG. The library would then assume the responsibility for preserving access to the XML, JPEG, and MPEG files. Recognizing that certain areas of study might have specialized needs that cannot be accommodated by XML, JPEG, or MPEG files, students can obtain the permission of their faculty committees to include other file types.

Since XML is simply a generalized markup syntax and does not include any encoding requirements per se, a decision had to be made regarding which Document Type Definition (DTD) would be adopted. Initially, an XML version of the TEI ETD used widely in the library community was seriously considered.[7] Upon further examination, however, the project team decided that TEI was inadequate for two reasons. First, the Graduate College required specific structural elements which could be forced into TEI elements, but were not a perfect fit (such as program of study, thesis supervisor, etc.). Second, the team held to the assumption that graduate students would be creating the XML documents themselves, and decided that the TEI syntax would be too

arcane for those who were unfamiliar with it.[8] Thus, the project team appointed a technical committee to draft an ETD DTD specific to the University of Iowa.

The ETD project team also established requirements for a small manuscript to accompany the ETD. This manuscript would include the front matter similar to a traditional print thesis or dissertation, an expanded abstract, and a discussion of the technology used to create the ETD. Not only would this manuscript serve as a placeholder in the University's historical record in a "doomsday" scenario, but also the accompanying manuscript was devised to meet the requirements for supporting documents imposed by UMI Dissertations Publishing.

By pursuing this course of action, the ETD project team and the technical subcommittee were able to balance successfully the needs of the Graduate College for creation of new scholarly publishing with the needs of the University Libraries for the continued delivery of scholarly resources. Through this partnership, graduate students are given the technological capabilities to exploit electronic publishing as a new communications medium while at the same time future researchers are ensured increased access and availability of these scholarly resources for their own study.

A Vision for Libraries

When envisioning how ETDs fit as an issue for university libraries, one must first consider the libraries' changing view on documents,[9] involving creation, storage and handling of multimedia, networks and access rights in transfer of information, and the use of multimedia in teaching and learning. What was once a document that was static can now be more dynamic in a digital library as reconceptualized by inclusion of sound, pictures, animation, and modeling, and much more accessible thanks to expanding networks for information in multimedia formats.

Libraries are challenged with providing structures that support overlapping educational and scholarly goals, online access for a variety of uses and users, archiving and preserving new formats, and integration of ETDs into other digitized collections and e-literatures. The library's vision for ETDs encompasses an array of issues preservation and access to these important works. The eye of our vision must remain focused on the student. Theses and dissertations stand without peers as representations of students' accomplishments, and ETDs will broaden this rich tradition in both content and accessibility. There are at least three key issues and challenges for libraries: access, preservation, and the availability of resources.

Continued full cataloging of ETDs that is consistent with cataloging for other theses and dissertations remains a central issue, as is developing mechanisms for managing the metadata. Libraries, in their effort to maximize access, are concerned not only about bibliographic access as representation of ETDs, but also the mechanisms that might establish relationships between ETD content and the use of the information contained therein by a diverse population of library users with access to the library's digitized collections.

Coupled with access issues are those involving archiving ETDs. By archiving, universities may consider theses and dissertations to be university archival records, and as such may fall under institutional records management policies. Archival policies for ETDs must also be consistent with institutional policies regarding management of electronic records. Preservation issues also involve both content and format. Electronic theses and dissertations contain any combination of the following: text, images, audio, video, 3-d models, animations. All elements should be considered to be of equal importance in an electronic thesis or dissertation. Libraries, universities, and the scholarly community-at-large are accustomed to thinking about thesis and dissertation work as text-based, as a reading of any thesis manual will confirm. However, it is possible that a simulation model might be the most important element of an electronic dissertation, regardless of how much text is included to describe the simulation. The extent to which libraries can sustain access to that simulation over time will be a challenge.

Third, the impact on resource allocation involves staffing and the costs associated with access, storage and preservation, and instruction. Few research universities are supported in their efforts to migrate to ETDs with either substantial external resources or major infusions of new funding from their parent institutions. Successful migration to an ETD model will require additional staff and storage space. Many institutions reaching the stage of implementing ETD programs have streamlined their processes, especially by adopting technology based on relative ease of use—PDF. While there is nothing wrong with PDF as a chosen technology for ETDs, it is a choice that fits neatly within a model of containing cost in training students, conversion and review by faculty and graduate schools, and in file transfer. Conversely, XML ETD as an option for students requires a substantial investment of time and resources to train library staff in cataloging, accessing and preserving students' work.

Finally, a key element to the vision is the partnership described earlier that libraries engage in with their respective graduate schools. In addition to processing, archiving, and making accessible ETDs, these groups have the opportunity to collaborate on instruction. Minimally universities can assist graduate students in converting their thesis work to an electronic format. Ideally they will develop a more ambitious curriculum assisting students in translating their ideas into an electronically enhanced thesis. This would likely result in a significant increase in the number of ETDs that are true electronic publications, as opposed to electronic versions of what is presently produced in print.

In summary, the potential for growth of electronic submissions is substantial. While ETDs have a natural fit within libraries' visions for building digital collections, there these and other issues relating to content, accessibility, archiving and preservation that will require our attention at the consortial, institutional, and international levels.

Notes

1. Elinor L. Katz, "Key Players in the Dissertation Process" *New Directions for Higher Education* 25, no. 3 (fall 1997): 7.

2. See Brent Kilbourn, "Fictional Theses," *Educational Researcher* 28, no. 9 (Dec. 1999): 27–32, for an argument that fictional writing could be presented as a doctoral thesis. The University of Iowa has accepted such works in the past. See for example Margaret Walker, *Jubilee: a Civil War Novel* (Ph.D. diss., University of Iowa, 1965).

3. See the standards for Extensible Markup Language as promulgated by the World Wide Web Consortium (http://www.w3.org/XML).

4. Kenneth D. Crews, *Copyright Law and Graduate Research: New Media, New Rights, and Your New Dissertation.* (Ann Arbor, Mich.: Bell & Howell Information and Learning, 2000).

5. See Michael D. Cohen and James March. *Leadership and Ambiguity: the American College President.* (Boston: Harvard Business School, 1986).

6. See the Text Encoding Initiative home page (http://www.uic.edu/orgs/tei) for more information about TEI.

7. TEI Lite DTD in XML (http://www.uic.edu/orgs/tei/lite/teixlite.dtd).

8. For example, using the TEI DTD, a thesis advisor's name could appear in a tag labeled "<titlePart ident=advisor>." With a specific ETD DTD, however, the name could appear instead in a tag labeled "<thesisAdvisor>."

9. Patricia Manson, "Towards a European librarys space: European Commission initiatives in library networking and technologies," paper presented at the ALA Annual Conference, July 8, 2000.