

ELECTRONIC THESES AND DISSERTATIONS (ETDs): A REPORT ON THE CURRENT ISSUES AND TRENDS AMONG ACADEMIC INSTITUTIONS

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January 2002

Teper and Kraemer¹ state in a recent article that they believe, “administrators must simultaneously accept that ETDs are here and that the reality is that ETDs are far from perfect.” This notion underlies the current state of ETD initiatives from a broad perspective and captures the overall dilemma that should serve as the focus of long-term strategic planning. This paper will attempt to expand on the two components from the Teper and Kraemer statement by first addressing the idea that “ETDs are here.” This section will describe the current activity associated with ETD initiatives and will also attempt to provide insight into the incentives that support ETD efforts. The second component of the Teper and Kraemer statement, “ETDs are far from perfect,” reflects the modern practice found in ETD programs. In this paper, I will attempt to address these concerns as they are commonly expressed throughout the academic community. Finally, this paper will suggest approaches under consideration by institutions attempting to contend with the current short-falls found in existing ETD programs.

ETDs ARE HERE

The subject of electronic theses and dissertations is one that attracts global interests from academics in many countries. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) promotes the free and universal exchange of scientific information and the transfer of advanced digital library and publishing technologies to developing countries. The organization attempts to formulate international strategy for creating and disseminating electronic theses and dissertations (ETDs). In September of 1999, UNESCO hosted an ETD workshop to discuss the strategy for an international ETD initiative. In his opening remarks, Mr. Philippe Quéau stressed that UNESCO's interest in the issue of ETDs is closely linked to its promotion of access to information in the public domain and the use of the Internet as a tool for disseminating scientific knowledge. He stressed that UNESCO is mandated by its Constitutions to ensure the "free exchange of ideas and knowledge." One of the primary goals of the Organization consists, therefore, in redefining free and universal access to information. The organization is interested in sponsoring an international project that facilitates transfer of expertise from developed countries to developing countries in the scientific areas covered by the theses and dissertations. In 2000, UNESCO initiated an effort to develop an online guide of best practices for developing an ETD program. The guide² was completed and published in 2001 and is composed of articles and “best practices” written by a variety of experts in the field, covering all aspects of an ETD program.

¹ Thomas H. Teper and Beth Kraemer, “Long-term Retention of Electronic Theses and Dissertations,” *College and Research Libraries* 63, no. 1 (January 2002) : 72.

² UNESCO, *The Guide to Electronic Theses & Dissertations*, (Paris: UNESCO, 2001); available from <http://www.etdguide.org>

The Networked Digital Library of Theses and Dissertations (NDLTD) is a collaborative effort established in 1996 to “promote the creating, archiving, distributing and accessing of Electronic Theses and Dissertations.”³ Since 1996, 110 universities and 15 institutions have joined in promoting the ETD effort. There are members from every continent in the world. The objectives of the NDLTD include;

1. Improving graduate education by allowing students to produce electronic documents, use digital libraries, and understand issues in publishing.
2. Increasing the availability of student research for scholars and preserving it electronically.
3. Lowering the cost of submitting and handling theses and dissertations.
4. Empowering students with the ability to convey a richer message through the use of multimedia and hypermedia technologies.
5. Empowering universities to unlock their information resources.
6. Advancing digital library technology.

The consortium that exists within the NDLTD sponsors an annual ETD conference to promote “best practices” among its peer institutional members. In 2002, the NDLTD will sponsor its Fifth Annual Conference⁴ in Provo, Utah. According to Suleman et al⁵, there were approximately 200 attendees at each of the last two conferences. In addition to conference sponsorship, the NDLTD has been actively involved in the development of a union catalog that provides users with a “simple and intuitive interface to search and browse through the merged collection of theses and dissertations.”⁶ VTLIS Inc., a developer of library automation software, partnered with Virginia Tech to develop a customized version of their Virtua ILS software to meet the specific needs of the NDLTD. Virtua ILS is well-suited for this task due to its inherent use of Unicode in its design. Unicode allows for Non-Western language characters and thus allows for multilingual searching and retrieval.

Another important ETD activity is the effort by Proquest (recently acquired UMI) to retain and deliver electronic dissertations of its contributing members. UMI dissertations abstract database contains the indexed scholarship of academic institutions from 1861 to present. The Digital Dissertation service has compiled over 100,000 dissertations that are accessible to subscribing members. Proquest provides a PDF version of dissertations that are submitted electronically and a TIFF image of those that are submitted in paper form. Proquest accepts the following file formats:

³ Hussein Suleman et al, “Networked Digital Library of Theses and Dissertations: Bridging the Gaps for Global Access – Part 2: Services and Research,” *D-Lib Magazine* 7, no. 9 (September 2001) : available from <http://www.dlib.org/dlib/september01/suleman/09suleman-pt2.html>

⁴ The Networked Digital Library of Theses and Dissertations, *The Fifth International Symposium on Electronic Theses and Dissertations* (Brigham Young University, Provo, 2002) available from <http://ce.byu.edu/cw/etd2002/>

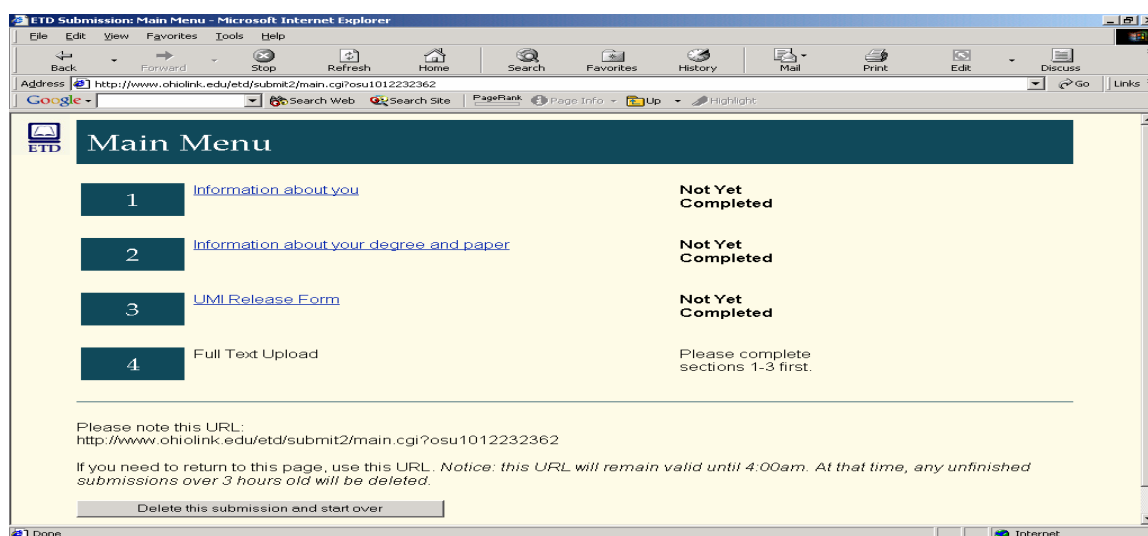
⁵ Hussein Suleman et al, “Networked Digital Library of Theses and Dissertations: Bridging the Gaps for Global Access – Part 1: Mission and Progress,” *D-Lib Magazine* 7, no. 9 (September 2001) : available from <http://www.dlib.org/dlib/september01/suleman/09suleman-pt1.html>

⁶ Ibid.

| Images: | Video: | Audio: |
|-----------------------|-------------------------|--------------|
| GIF (.gif) | Apple Quick Time (.mov) | AIF(.aif) |
| JPEG (.jpeg) | Microsoft Audio Video | CD-DA |
| PDF (.pdf) use Type 1 | Interleaved (.avi) | CD-ROM/XA |
| PostScript fonts | MPEG (.mpg) | MIDI (.midi) |
| TIFF (.tif) | | MPEG-2 |
| | | SND (.snd) |
| | | WAV (.wav) |

Table 1

There are several consortium ETD initiatives occurring both in the United States and abroad. One such is the Australian Digital Theses (ADT) Program which is attempting to make the 4000 theses, produced annually in Australia, available electronically to a worldwide audience. Like so many others have stated, the Australian project makes note of the fact that theses are terribly under utilized and that digitization addresses this concern. The ADT project attributes this low usage to: (1) a lack of knowledge that the theses exists, (2) lack of knowledge regarding content, and (3) a lack of availability. The ADT repository model is very similar to that used by the NDLTD. They both work by creating a common user search interface for all theses and dissertations from participating member institutions. This is made possible by a method referred to as metadata harvesting. The ADT and the NDLTD provide a harvester service that can periodically check the local institution's "outbox" for new records that provide descriptive data about the theses or dissertation. The descriptive record includes a uri for the actual location of



the document. Once the information is received by ADT and NDLTD, it is then indexed and made searchable via the host website.

Closer to home, the Ohio Library and Information Network (OhioLink) has established a service for its participating members that allows the ETD to be submitted electronically in its entirety to OhioLink where it is then indexed and made available for access. The submission process is fully automated and is designed to walk the submitter through the process in a step-by-step fashion (Figure 1). The documents are stored on the OhioLink server in PDF format and can be browsed by author, university /department, or keyword

searched. Currently, the University of Cincinnati, Miami, Ohio State, Ohio, Wright State, and Youngstown State Universities all are making ETDs available through the OhioLink service.

Many academic institutions around the globe have adopted ETD programs as part of their traditional program. Virginia Tech developed a short-term solution to ETDs in 1994 and since that time, many other institutions have adopted its basic model. In general, this approach relies on Adobe's Portable Document Format (PDF) as a means for storage and retrieval of the ETD. From the outset, PDF was intended to serve as a short-term solution for the creation of ETDs. In 1997, Virginia Tech made the decision to require electronic submission for all theses and dissertations on its campus.

Virginia Tech ETD Accessibility

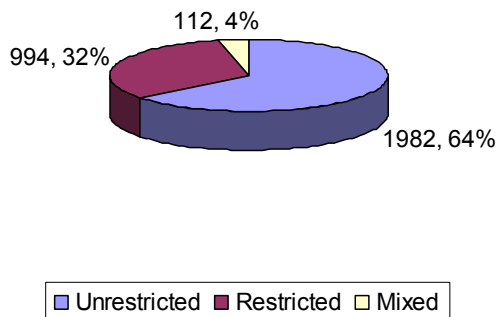


Figure 2

There are currently 3088 Virginia Tech theses and dissertations indexed and available online. 64% (Figure 2) of the total number are currently available to the general public for access. The Virginia Tech availability numbers far exceed the availability level at any other single institution. According to Moxley, “1,565,151 PDFs (largely ETDs) were downloaded by users”⁷ from the Virginia Tech website in 2000-2001. The numbers seem to clearly indicate that Virginia Tech ETDs are being widely accessed and are likely benefiting many in the process.

The University of Kentucky's (UK) ETD program has developed over the last couple of years and follows closely with the Virginia Tech approach. UK encourages students to begin early familiarizing themselves with the ETD program as well as learning about copyright and the publishing process. Students are also encouraged to declare their intent to submit electronically as early as reasonable in their academic careers. UK requires that everyone submitting an ETD must submit the document in PDF format. In addition, the university will also accept an html version of the ETD to be made accessible via the university website. UK also requires the following:

- Compression or password protection must not be used.
- All fonts used should be embedded in the document. If they are not, your work may not display properly when accessed and the text may not be fully searchable.

⁷ Joseph M. Moxley, “Universities Should Require Electronic Theses and Dissertations: Making Theses and Dissertations Available Electronically Widens their Exposure and Usefulness,” *Educause Quarterly* 24, no. 3 (2001) : 61.

- External or internal links to multimedia files are acceptable. If such elements are used, file formats should be identified in the Abstract.
- Only selected multimedia file formats are automatically approved for inclusion (Follows the Proquest approved formats listed in Table 1)
- All ETDs must also be accompanied by paper copies of any reprint permission letters and any required third-party software licenses. [Electronic (doctoral) dissertations must also be accompanied by paper copies of the Title Page and Abstract.]
- To avoid possible cross-platform problems and difficulties in future archival processes, the filenames of all the files comprising an ETD must follow the DOS 8+3 system: abcdefgh.xyz. Use English letters and Arabic numbers only; no extra punctuation or diacritical marks or spaces. For example, JJSthes.pdf, not John Smith Thesis.pdf; Chapt2.pdf, not Chapter 2.pdf; Fig04.jpg, not Figure 4.jpg.

UK cites several benefits to completing the theses or dissertation electronically. The ETD allows for richer content through the use of multimedia, including integrated video, audio, animation, graphics and interactive elements. In addition, the ETD will also offer broader exposure of the student's work since time and space no longer place restrictions on access. UK also states that the electronic approach allows for faster availability of the student's work, increased search ability within the text, and provides the student with a valuable experience in preparing electronic manuscripts. Like many institutions, Kentucky decided that it wanted to give its students the option of submitting either electronically or using the traditional approach. Very few institutions have completely done away with the traditional model in favor of the mandatory ETD. According to the University of Kentucky, they "do not have plans *right now* to make ETDs mandatory" and will offer options into the foreseeable future. Kentucky state law also mandates that the University retain a copy of all theses and dissertations for perpetuity.

Vanderbilt University conducted a pilot ETD program in 1999/2000, in which only certain departments participated on a volunteer basis. Like Virginia Tech and Kentucky, Vanderbilt requires that students submit their final work in PDF format. Students are required to purchase the Adobe Acrobat Exchange package in order to prepare their work for final submission to the graduate school. The software is available at the Vanderbilt campus bookstore at a cost of \$44.95 with a student ID. The University has dedicated a 4 terabyte server to provide long-term storage for ETDs and does not place any size restrictions on a student's ETD submission. To help students cope with the issues and concerns of publishing their work elsewhere at a later date, Vanderbilt is considering the adoption of an accessibility model similar to Virginia Tech. Vanderbilt states:

Sequestered (the work will be archived on the library server but will not appear on the website), Vanderbilt only (access to the document via the web will only be possible within the Vanderbilt domain), and General Access (the document will be available to anyone who accesses the ETD website). The student may change from Sequestered to UGA only or General at a later date.

Lew Harris of the Vanderbilt Register stated “Advocates of electronic theses and dissertations argue that they allow forms of communication unavailable on paper--digital quick-time movies, sophisticated graphics, computer-generated images, computer modeling and digital sound. Such additions can significantly enhance a manuscript, and multimedia resources can add elements to certain fields like music, dance and architecture that revolutionize the way material is presented.”⁸ Paul Gherman, University Librarian adds, “I think the scientists are much more accepting of this idea because they need to get their new findings and new scholarship out quicker than the humanists. The sciences move so quickly that if you took a year or two to publish your research, someone would have bypassed you or taken your ideas.”⁹

Like Virginia Tech, West Virginia University has implemented a policy that requires all theses and dissertations be submitted electronically. The school basis it’s decision for mandatory ETDs on the idea that they contribute to worldwide graduate education and provide a means of “unlocking” the under utilized results of academic graduate research. John Hagen, Library Technical Consultant for West Virginia University Libraries believes that the success of the ETD program has helped to create a “heightened sense of awareness on campus of the profound effects of information technology,” and that this has help to bring a whole host of IT developments to the West Virginia campus.

All of the institutions mentioned to this point offer workshops to help students deal with some the technical issues involved in preparing the ETD. Developing the expertise needed for teaching faculty, students, campus administrators, and libraries is drastically reduced by employing the established methods developed by the NDLTD and Virginia Tech. The grant supported activities of these two organizations have been well funded over several years and it is this funding that is benefiting many academic institutions today.

In a recent article published in Educause Quarterly, Joseph Moxley writes, “While in the past a university’s quality was linked to its library, in the future a university’s quality will be link to its digital library of theses and dissertations.”¹⁰ Moxley argues that scholars, both student and faculty, benefit from the increased exposure level that is evident with ETDs.

⁸ Lew Harris, “Electronic Theses, Dissertations Debut at Vanderbilt,” *Vanderbilt Register Online*, (January 1998) : available from http://www.vanderbilt.edu/News/register/Jan19_98/vr6.html.

⁹ Ibid.

¹⁰ Joseph M. Moxley, “Universities Should Require Electronic Theses and Dissertations: Making Theses and Dissertations Available Electronically Widens their Exposure and Usefulness,” *Educause Quarterly* 24, no. 3 (2001) : 61.

ETDS ARE FAR FROM PERFECT

ETD supporters can be found on every campus and yet even some of its biggest followers openly admit that there remain issues and concerns that must be addressed before we can all be fully convinced of its merit. Most of the concerns being expressed appear to primarily be an unease about the long-term retention of ETDS. Teper and Kraemer¹¹ state “Unlike the retention of paper documents, the long-term retention of electronic documents is an active, resource-intensive process.” The authors’ examined ETD programs which are available through the *National Digital Library of Theses and Dissertations* (NDLTD) and concluded that few programs actually consider the long-term ramifications with regard to preservation of ETDS. Contrary to Teper and Kraemer’s concern, Moxley argues, “a document that can be read over the course of several years by many people is preferable to a document available for a million years and read only by a few people.”¹² The question that seems most appropriate at present is whether or not we can have our cake and eat it too. ETDS are clearly opening doors for many who have had limited access in the past. No one can deny that knowledge sharing is a remarkable cultural resource that would seem to have its greatest value when it is provided at the appropriate time. The current approach to ETDS does appear to solve the concerns over short-term access, but does not answer all of the questions with regard to long-term access. Can we have a document that can be read over the course of several years by many people as well as one that will be available for a million years to be read by a few more?

The primary format used to deliver documents over the Internet is Adobe’s PDF. PDF was first conceived in 1991 and has since become a “proprietary standard” for electronic document delivery. At its core, PDF is actually a rendition of postscript, a programming language optimized for printing graphics and text. The postscript language was developed by Adobe in 1985 as a means of generating device-independent print images. Adobe’s history with this core technology is one that extends over 17 years. Most ETD operations have accepted PDF as a low-cost solution for the delivery of electronic documents. The reduced training and minimum technical start-up issues, makes PDF an attractive choice for document delivery. The University of Kentucky states “Students already using modern word-processor software need only one or two 2-3 hour instructional sessions to learn how to convert documents into PDF format.”¹³ The question remains, can Adobe guarantee the long-term retention of its PDF format. In spite of the fact that the Government Printing Office (GPO) has accepted PDF as a preferred format, there remain many questions within the GPO about its long-term

¹¹ Thomas H. Teper and Beth Kraemer, “Long-term Retention of Electronic Theses and Dissertations,” *College and Research Libraries* 63, no. 1 (January 2002) : 62.

¹² Joseph M. Moxley, “Universities Should Require Electronic Theses and Dissertations: Making Theses and Dissertations Available Electronically Widens their Exposure and Usefulness,” *Educause Quarterly* 24, no. 3 (2001) : 63

¹³ The University of Kentucky ETD Committee, “Report of the Ad Hoc Committee on Electronic Theses and Dissertations,” (June 2000).

viability. During Preservation 2000 International Conference, Barnum and Kerchoff state:¹⁴

Presentation of electronic publications that rely on an open standard, such as HTML (for text) or TIFF (for images) will presumably remain straightforward as the Web and its successor technologies develop. Publications, however, that rely on a proprietary format or commercial software for their use pose serious challenges, since backward compatibility in newer technology will depend on market forces and demand. GPO cannot consider content separate from access and access mechanisms; thus the greatest challenge over the coming years will be to keep publications captured in 2000 viable despite the advance of technology. Transfer of all publications in the archive to a single, migration-friendly, open standard format has not, in the interest of preserving the official nature of the publications, been pursued thus far. Such transfer may, however, present itself as the best alternative for keeping archived publications alive. Likewise advances in electronic archiving may conceivably separate format from storage and re-presentation and thus ease the dilemma.

Barnum and Kerchoff appear to be clearly expressing their concerns with using proprietary formats to solve long-term commitments.

One could easily argue that in the long-term, the PDF approach is a gamble that could potentially leave many scholarly works stranded in digital purgatory. Some institutions are beginning to explore Standard Generalized Markup Language (SGML) and Extensible Markup Language (XML) as an option for overcoming PDFs inadequacies. SGML is a standard for electronic text that was adopted by the International Organization for Standardization in 1986. William Tunnicliffe is credited by many as laying the groundwork for Generalized Markup Language (GML). In 1967, Tunnicliffe gave a presentation to the Canadian Government Printing Office on separating information content from document format. This concept was adopted by an IBM research team in 1969, lead by Charles Goldfarb. The work of Goldfarb, Mosher, and Lorie produced the GML method of text editing, formatting, and information retrieval. Then in 1978, under the leadership of the American National Standards Institute (ANSI) an initiative to standardize GML was launched. Finally in 1986, the International Organization for Standardization adopted the working draft as ISO 8879:1986 SGML actually has witnessed very limited use outside of a few specialized groups due to cost and technical complexity issues. Many argue that the complexity and size of the tagging language does not lend itself to being easily adopted.. XML was developed by the SGML Editorial Board formed under the World Wide Web Consortium (W3C) beginning in 1996. The new standard takes only the parts of SGML that is relevant to an Internet-based world.

The design goals for XML are:

¹⁴ George D. Barnum and Steven Kerchoff, "The Federal Depository Library Program: Preserving a Tradition of Access to United States Government Information" (paper presented at Preservation 2000: An International Conference on the Preservation of Long-term Accessibility to Digital Material) Available online from: <http://www.rlg.org/events/pres-2000/barnum.html>.

1. XML shall be straightforwardly usable over the Internet.
2. XML shall support a wide variety of applications.
3. XML shall be compatible with SGML.
4. It shall be easy to write programs which process XML documents.
5. The number of optional features in XML is to be kept to the absolute minimum, ideally zero.
6. XML documents should be human-legible and reasonably clear.
7. The XML design should be prepared quickly.
8. The design of XML shall be formal and concise.
9. **XML** documents shall be easy to create.
10. Terseness in **XML** markup is of minimal importance.

Today XML is a W3C Recommendation. This means that XML has been reviewed and approved by the members of the W3C. XML is therefore deemed "stable" and ready for widespread deployment. A Recommendation is the highest level a W3C document can be assigned and it became a Recommendation on February 10, 1998. Unlike SGML, XML has received widespread acceptance and is being utilized in a number of different service areas for information exchange. The e-commerce industry has firmly latched onto XML for its many benefits for transmitting data in a standardized format.

There are several institutions that have begun to explore the possibilities of using XML markup language as a method for composing ETDs. Virginia Tech recently completed a project¹⁵ that involved the creation of an XML schema to be used for encoding sample XML ETDs. The project also involved the use of XSLT to render the documents in HTML to a web browser. Virginia Tech also experimented with Microsoft Smart tags as a method of automating the conversion from Microsoft Word to XML. The project was successful at delivering XML-based ETDs however the report did not provide any insight on the difficulty level, cost, time, etc. The study found smart tags to be ineffective due to the nature of the tag naming scheme within theses and dissertations. However they did discover that Visual Basic for Applications (VBA) could be quite effective at creating a Word template where theses or dissertation content could be pasted into specified fields within the template.

The TDM ETD schema written at the University Iowa is also based on TEI but uses embedded HTML. The author describes the technique as being comparable to XHTML. From recent conversations with Paul Soderdahl of Iowa, I've discovered that the school is planning to collaborate with Michigan State on authoring a more universal schema that will accommodate a greater variety of ETDs. An offer was extended to the University of Tennessee to participate in this collaborative effort. More recently, I visited the Iowa ETD website and discovered that their ETD program has been temporarily suspended due to budgetary reductions.

The University of Kentucky recognizes the temporary nature of a PDF ETD program and has also begun exploring XML as an alternative long-term approach. According to Jim

¹⁵ Mathew Aguirre et al, "ETD XML Final Report," (An online report of XML testing at Virginia Tech), available at http://rocky.dlib.vt.edu/~cs5604/fall_2001/etd_xml/

O'Reilly, "one of the tasks our ETD Committee is actively working on this year is to investigate and/or prepare a plan for implementing ETDs in XML format." The ETD Committee at the University of Kentucky has asked Linda Cantara, Coordinator for Research in Computing for Humanities to investigate and report on the feasibility of XML ETDs. Kentucky has also expressed an interest in exploring the use of HTML as a temporary archival format. This would appear to be based on the idea that migration to a content-based markup language (XML) would be easier if retro-conversion becomes necessary in the future.

In October 1999, Matt Stoeffler of the University of Michigan published a report titled "Publishing Dissertations at the University of Michigan in XML: A Report of a Study." Stoeffler reported that a two-year study into the feasibility of publishing ETDs in XML resulted in the successful encoding of eight test documents using a DTD derived from the Text Encoding Initiative's TEI Lite DTD. He also cited the following advantages using XML:

1. Consistent and flexible styles
2. Optimal archival format
3. Flexibility of delivery
4. Platform-free access
5. Superior server-side functionality (searching), and
6. Strong client-side functionality

In light of the many schemas/DTDs present for marking up ETDs, there is still a major concern with using XML because there has not yet been a completely reliable schema developed for use with varied theses and dissertation types. To be truly universal, one would need to take inventory of the varied elements found in theses and dissertations across a variety of disciplines. TeX and LaTeX are programming languages that allow for mathematical expressions and are significantly represented in the field of theses and dissertations. A universal XML schema would need to account for the special tagging found in these languages if it were to successfully adopt every theses and dissertation. Another issue with deploying XML is the steep learning curve needed to prepare students for writing an XML ETD. Compared with PDF, the institutional investment in resources must be far greater in order to effectively carry out an XML ETD program. This is likely to improve with time, but for now there is certain cost factors that make XML ETD relatively cost prohibitive.

Despite the fact that HTML, TIFF, and others have become open standards for file formatting, concerns remain as to whether these standards will weather the years of technology evolution. File formats are interwoven into layers of computer programs (OS, viewer, etc.), which means that retrieval of the object (document, image, etc.) requires that all programming layers be present. What this means is that one cannot simply move into the future with a set of electronic documents and assume that the documents will be usable. Teper and Kraemer argue that unlike physical documents, electronic documents do not like being left alone. They require a significant amount of time and attention to insure the continued life of the information content. In addition to requiring a very active

preservation program, Teper and Kraemer assert that “The process for creating permanent digital surrogates akin to preservation microfilm is not yet a reality.”¹⁶ As of yet, there is no archival standard for electronic formats. Some have begun to explore this issue in-depth and we may soon be provided with a set of guidelines from which we can work from. LOCKSS (Lots of Copies Keep Stuff Safe) is one such model that maintains that it applies the old traditional model of multiple copies to help insure longevity. The joint project consisting of Sun Microsystems and Stanford University Libraries, has been funded by the National Science Foundation. LOCKSS present a solution to the problem in three parts:

1. The content must be preserved as bits.
2. Access to the bits must be preserved.
3. The ability to parse and understand the bits must be preserved.

The Open Archival Information System (OAIS) reference model is a conceptual framework for an archival system dedicated to preserving and maintaining access to digital information over the long term. Similar to the LOCKSS approach, OAIS recognizes the importance of preserving at the bit-level:

For digital information, this means the OAIS must clearly identify the bits and the Representation Information that applies to those bits. This required transparency to the bit level is a distinguishing feature of digital information preservation, and it runs counter to object-oriented concepts which try to hide these implementation issues.

Aside from the issues that center on preservation, there are other areas of concern that should be considered. Some are expressing concerns about ETD printing and the fact that most people still prefer to read lengthy materials from printed pages versus a video monitor. Weisser and Walker stated that “the cost of paper and toner can add up, and paying a commercial print shop to print out an ETD file can be as costly as (or perhaps more costly than) ordering through UMI.”¹⁷

According to an article published in the Vanderbilt Register, “Critics of electronic dissertations argue that their wide availability could negatively impact the tenure process, promotion or perhaps even grants, all of which require publication in scholarly journals. Most publishers will not accept manuscripts that are already available on the Internet. However, many university presses do not regard UMI- or ETD-submission as prior publication.”

University of Kentucky Cited Issues and Concerns:¹⁸

¹⁶ Thomas H. Teper and Beth Kraemer, “Long-term Retention of Electronic Theses and Dissertations,” *College and Research Libraries* 63, no. 1 (January 2002) : 65.

¹⁷ Christian R. Weisser and Janice R. Walker, “Electronic Theses and Dissertations: Digitizing Scholarship for its Own Sake,” *The Journal of Electronic Publishing*, (December 1997).

¹⁸ The University of Kentucky ETD Committee, “A Report of the Ad Hoc Committee on Electronic Theses and Dissertations,” (June 2000), available from <http://www.rgs.uky.edu/gs/ETDCommitteeReport.pdf>

- **Will Publishers publish articles**, chapters, and whole books that are derived from material that is freely available on the Web? Could economic, copyright, and prestige issues result in reluctance or outright refusal on the part of publishing houses or professional societies to also publish this material?
- Possible **loss of intellectual property rights**. Will students, their advisors, and any funding sources lose some of their full rights to the material and possible benefits derived therefrom?
- **Plagiarism is easier** with electronic originals, both in the ETD itself and from it in other's works. (But it is also easier to detect.)
- **Long-term electronic archival standards and software convertibility are not yet established**. Will the ETD still be accessible in 50, or even 10, years in the future? This is clearly a problem that has not been solved.
- **All fair-use and copyright requirements must be observed very strictly** by the student. Although these requirements are legally no different from those for theses and dissertations submitted in paper medium and are obligations of any scholarly activity, the much easier and greater accessibility of ETDs makes these issues of heightened concern.
- **Intermediate paper copies** are almost always necessary for the Advisor and Advisory Committee to read and edit. This could result in a greater, not lesser, burden of work for the student at perhaps the most critical time in his or her graduate career.
- **Insufficient infrastructure support** could result in higher, not lower, expenses for the student and/or the academic program in purchase of needed software and equipment, as well as in increased work and frustration in learning how to use new software.

Despite the lists of concerns over the current approaches to administering an ETD program, much evidence exists within the ETD community indicating there are many attempts underway to address some of these concerns. All of the solutions mentioned however are in the earliest stages of development and will likely require time and energy by many before they are viable solutions.

The University of Tennessee will want to collectively decide on the position it takes with regard to its future with ETDs. Gaining a clear understanding of the community sentiment over ETDs will certainly help to insure that the program advances favorably and will allow us to place a level of importance on the program itself. Virginia Tech conducts climate surveys to help determine its success with its ETD program. This approach could certainly add to our level of understanding with regards to the perception of ETDs by the campus students, faculty, and administrators. Another measure that would likely be of benefit in future decision making is a cost analysis of the current UT ETD program. Currently, there are several UT departments involved in the ETD program, each contributing to some level in the associated cost of producing ETDs. Further development and formalizing of the data dictionary for ETDs would provide good content analysis of the theses and dissertation structure that could be used in the development process no matter what direction the program ultimately advances. The

Library's new multimedia studio will likely play an important role for some. The studio service is designed to offer the resources needed to produce high quality, multimedia-based works to those seeking this type of approach to content. The ETD committee will want to work closely with the library and the new studio service to insure that students understand the issues regarding archival quality work required of an ETD. Finally, it would seem important enough to mention that UTs continued association with the NDLTD can only have positive results. The collective momentum of this consortium has offered many advantages and will almost certainly continue into the future. The ETD community has some very specific technology needs and the consortium offers an advantage for insuring that these needs are met.