Improving Education and Understanding of NDLTD

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Abstract

To understand ETDs, what NDLTD is, how it works, and the benefits of NDLTD, it is necessary to educate those involved, such as students who will create and submit their ETDs, as well as the library staff members who will be participating in NDLTD and administering their local system. To help educators prepare digital library (DL) courses supportive of their goals, our DL curriculum group has been developing educational modules and conducting field analyses since January 2006.

This paper is a follow-up to our previous study of the subject distribution of ACM DL papers, JCDL papers, and D-Lib Magazine articles. In this paper, we focus on the selected DL modules that might help scholars conduct their research and share their knowledge. The contents are:

- Revised DL educational module framework: Based on our analysis of hundreds of DL papers, we identified 10 core topical areas, and 43 sub-areas. A detailed diagram is provided.
- After discussion, our team selected several DL modules which might be the most relevant to scholars' research endeavors. Especially, those modules are important to fully utilize ETDs. The module numbers and their descriptions are presented.
- To help scholars navigate and study the corresponding ETD Guide (www.etdguide.org) sections, we mapped the selected DL modules into the Guide sections. The section numbers, titles, and starting page numbers are provided.
- In our previous study, we've collected DL course syllabi in the computer science (CS) and the library and information science (LIS) areas. Then the readings were retrieved from the syllabi collections. These readings were classified into the selected DL modules. They are presented here; the complete data can be accessed from our project web site.

Increased understanding about DLs might improve scholars' research efficiency and effectiveness as well as universities' participation in NDLTD. We invite the ETD community to assist with module development and evaluation so students, scholars, and staff will know more about DLs.

1. Introduction

This paper is a follow-up to the Digital Library Curriculum Development Group's previous one [4] presented at ETD 2006. In the previous paper, we introduced our project plan, timeline, advisory board members, foundational digital library (DL) principles (5S [1, 2, 3]) of the project, 19 educational module framework, and the module template. Since then, we had two meetings with advisory board members, in JCDL'06 and ASIS&T'06; discussions with an expert in the educational technology field regarding module development; presentations at various conferences such as JCDL'06, ECDL'06, ICADL'06, and ASIS&T'06; project team meetings; and multiple publications. For details of our project progress, please see our blog at http://tuppence.dlib.vt.edu/blogs/index.php?blog=2. Based on our plan [4] and feedback from our advisory board and group discussions, we have updated the DL module framework (see Figure 1), developed more draft modules, collected DL course syllabi from the CS and LIS areas, extracted readings from those collections, and classified the readings into the DL module framework. We also downloaded the readings as long as they are available on the open web, and converted them into PDF format files if they were in HTML format. We plan to upload them to an EPrints system based archive for easy and open access.

The next section presents our latest module framework which contains 10 core-modules and 43 sub-modules. The update process is described. In Section 3, several selected educational modules are presented with their descriptions based on the project group's discussion. We think those selected modules will help scholars do their research projects and share their findings in the form of ETDs. In Section 4, we mapped the selected modules into ETD Guide sections so that scholars can easily navigate and study the corresponding sections of the ETD Guide. Reading lists for selected modules are shown in Section 5. Then the summary, acknowledgement, and reference sections.

2. DL module framework

CORE TOPICS			
1	Overview	1-a (10-c): Conceptual frameworks, theories, definitions	1-b: History of digital libraries and library automation
2	Digital Objects	2-a: Text resources 2-b: Multimedia	2-c (8-c): File formats, transformation, migration
3	Collection Development	3-a: Collection development/ selection policies 3-b: Digitization	3-c: Harvesting 3-d: Document and e-publishing/ presentation markup
4	Info/ Knowledge Organization	4-a: Information architecture (e.g., hypertext, hypermedia) 4-b: Metadata, cataloging, metadata markup, metadata harvesting 4-c: Ontologies, classification, categorization	4-d: Subject description, vocabulary control, thesauri, terminologies 4-e: Object description and organization for a specific domain
5	Architecture (agents, mediators)	5-a: Architecture overviews/models 5-b: Applications 5-c: Identifiers, handles, DOI, PURL	5-d: Protocols 5-e: Interoperability 5-f: Security
6	User Behavior/ Interactions	6-a: Info needs, relevance 6-b: Search strategy, info seeking behavior, user modeling	6-c: Sharing, networking, interchange (e.g., social) 6-d: Interaction design, info summarization and visualization, usability assessment
7	Services	7-a: Search engines, IR, indexing methods 7-b: Reference services 7-c: Recommender systems	7-d: Routing, community filtering 7-e: Web publishing (e.g., wiki, rss, Moodle, etc.)
8	Preservation	8-a: Approaches to archiving and repository development	8-b: Sustainability 8-c (2-c): File formats, transformation, migration
9	Management and Evaluation	9-a: Project management 9-b: DL case studies 9-c: DL evaluation, user studies 9-d: Bibliometrics, Webometrics	9-e: Legal issues (e.g., copyright) 9-f: Cost/economic issues 9-g: Social issues
10	DL education and research	10-a: Future of DLs 10-b: Education for digital librarians	10-c (1-a): Conceptual framework, theories, definitions 10-d: DL research initiatives

Figure 1: DL Module Framework

After we conducted a series of paper classification tasks [5, 6] and received feedback from advisory board members and group discussions, we updated the 10-module framework (see Figure 1). Four different versions of the module framework diagrams can be accessed at http://curric.dlib.vt.edu/DLcurric/resources.html. After an iteration of the classification tasks, we found that some topics in the papers were not shown in the current module framework or very few papers were classified into a module in the framework. In the case of the former, we collected those new topics and carefully added them to the module framework after having a discussion. In the case of the latter, we discussed whether the topics could be merged together or whether ones should be dropped from the framework diagram.

Among the 43 sub-modules, 1-a(10-c) and 2-c(8-c) are assigned to two core modules simultaneously. Except for those, we tried to assign a sub-module into the closest single core module, for clarity and simplicity. After discussing '4-a: Information architecture (e.g., hypertext, hypermedia)', we finally decided to put it under '4 Info/knowledge organization.' '1-b: History of digital library and library automation' is one of the new topics added to this version of the framework. Also the order of the modules, '2: Digital Objects' and '3: Collection Development', has been switched in this version considering that the flow from module 2 to module 3 is more natural (from a single item to a group of them). The modules, '5: Architecture', '7: Services', and '9: Management and education,' further discuss how to utilize the collections effectively and efficiently within the structure of a DL.

The project team has been developing draft sub-modules. They will be presented in workshops connected with JCDL '07 and ECDL '07. The ECDL workshop participants will evaluate the draft modules in pairs or in small groups. Based on their evaluation and feedback, we will update and refine our modules. Once the modules are refined, they will be provided through our project web site.

3. Selected DL modules for scholars

After a group discussion, the project team selected several DL modules which might be the most relevant to scholars' research endeavors. Studying the materials in those modules is important to fully utilize ETDs and DL systems in general. In this section, we provide the selected modules and their descriptions. In the following sections, we map them to the ETD Guide sections and present the corresponding reading materials from our syllabi resource collections.

Scholars will understand foundational DL concepts and frameworks such as 5S [1, 2, 3] from module 1-a(10-c). Since most papers in NDLTD systems are in PDF format, papers written in MS Word doc or other formats are transformed into PDF format before submission to NDLTD. In addition, scholars should know about tools to display documents in various formats. 2-c(8-c) will be appropriate for this purpose. 3-b will show overall digitization processes, for example from a personal scanning in pictures for an ETD to an automated large-scale systematic digitization process to develop a DL with traditional materials which are not in digital formats. The knowledge about XML and its use is essential in understanding the resources in DLs. 3-d will suit this purpose. One of the important ETD submission steps is to provide metadata for easy searching and browsing.

Understanding of different metadata standards will help scholars when they use DLs in specific domains. The details of the metadata markup, cataloging, and harvesting are introduced in 4-b. The lessons in 4-d will assist the writers of ETDs in choosing appropriate keywords. When dealing with large numbers of digital objects, 4-d's 'vocabulary control' might be very useful to organize them. 5-c is about assigning an identifier to a digital object for long-term access on the network. By using the 'marks' of the Superimposed Information

technology [8], scholars will be able to present only the relevant portions of their documents to the readers (introduced in 5-c). Providing a search mechanism to help scholars find relevant papers is one of the important NDLTD services. Module 6-b explains various search strategies used in information retrieval. In addition, the user modeling and feedback techniques described in the module occur in the more effective and efficient search algorithms.

Instead of downloading or submitting papers individually, if a group of scholars with the same research interests can share papers in a group collection, it might have synergistic effect on their research endeavor. They might save time by browsing the group's papers and other relevant resources. By adding comments and rating the papers, group members can help each other access the most relevant and high-quality ones. '7-e: Web publishing' module introduces and explains online tools that support the aforementioned functions. '9-b: DL case studies' introduces various case studies in DL area. This module might be the most interesting to scholars who want to develop their own DLs. In '9-e: Legal issues', controversial issues such as copyright and privacy protection as well as the technologies to support them are discussed.

Table 1: Selected DL modules for scholars

DL Module	Description
1-a(10-c):Conceptual frameworks, theories, definitions	As a sub-module of '1: Overview' module, it introduces digital library frameworks such as the '5S framework', theories, models such as DL reference models, and definitions of various terms. This module can be taught to give the overall idea of the DL system and its surroundings.
2-c(8-c):File formats, transformation, migration	Also included in the framework as 8-c, as pertains to long-term archiving and preservation. This module is concerned with formats and transformations from one format to the other for purposes other than preservation, e.g., flexibility of display.
3-b:Digitization	Common approaches for selecting materials for digitization, the digitization processes, and challenges regarding digitizing and representing digital objects will be covered. This module will evaluate practical considerations adopted for digitization and representation in existing DLs.
3-d:Document and e-publishing/presentation markup	XML is currently the most well-known markup for digital resources in DLs. This module will explain the major components of XML; functions and applications will be introduced.
4-b:Metadata, cataloging, metadata markup, metadata harvesting	Intellectual, structural, administrative, and technical approaches to creating, maintaining and updating metadata will be described. It also covers the development history and issues of metadata standards. The metadata standards for DLs such as Dublin Core will be introduced and practical exercises to create metadata will be included. In terms of metadata generation methods, the challenges of automatic versus human-intermediary methods, including the ideas of author-created metadata, will be discussed.
4-d:Subject description, vocabulary control, thesauri, terminologies	When choosing keywords for a paper, consideration of the subject description is needed. Thesauri and terminologies are used for effective information retrieval of resources. In addition, vocabulary control mechanisms for DL collections and their applications in DLs will be introduced.
5-c:Identifiers, handles, DOI, PURL	Identifiers (e.g., handles, DOIs, PURLs) share similar design concepts and usage, which are to name a resource in a unique way so that it can be accessed in the network for a long-term period. The details of these

	technologies will be presented in this module. In addition, a cutting-edge technology, Superimposed Information 'marks', will be introduced.
6-b:Search strategy, info seeking behavior, user modeling	This module focuses on the searching service of DLs. It will mostly deal with the various retrieval methods developed in DLs. The behavioral differences of traditional library users and DL users will be introduced. Methods for DL user modeling and feedback analysis will be discussed.
7-e:Web publishing (e.g., wiki, RSS, Moodle, etc.)	Various tools/technologies that support publishing/sharing on the internet will be presented. Their features will be discussed and the design concepts will be compared.
9-b:DL case studies	Various case studies conducted in the DL area will be introduced.
9-e:Legal issues (e.g., copyright)	This module first defines the purpose of copyright and copyright protection of DL resources, and discusses the controversial issues related to privacy. It will also deal with technical methods to protect the author of resources.

4. Selected modules mapped to the ETD Guide sections

Once we selected modules as shown in Table 1, we mapped each module to the corresponding sections of the ETD Guide (see Table 2). The starting page number of the section in the PDF version of the Guide is presented in the parentheses. Instead of browsing the whole ETD Guide, scholars can read just the relevant sections by using Table 2. The module, '3-d: Document and e-publishing/presentation markup', has the largest number (27 sections) of ETD Guide sections followed by '4-b: Metadata, cataloging, metadata markup, metadata harvesting' module (12 sections) and '2-c(8-c): File formats, transformation, migration' module (10 sections). Probably it is because preparing an electronic document, its metadata, and the markup for the presentation, are fundamental in ETD systems. In contrast, '3-b: Digitization' does not have any corresponding ETD Guide sections. One possible reason for this might be because nowadays ETDs are created digitally. Therefore there is no need to digitize a paper-based thesis or dissertation or to include the ETD Guide section on digitization (unless there is a retrospective conversion effort or old multimedia content).

In Table 2, three document formats appear – one is MS Word doc format, another is PDF format, and the third is PostScript. For markup languages, the use of SGML and XML is explained. The word processing tools presented in Table 2 are MS Word, LaTeX, MS Office 2000, Corel WordPerfect, and FrameMaker. As these tools are upgraded, their ETD Guide sections should be updated with new features. If new word processing tools such as docs.google.com (online word processing tool which supports various document formats) are used widely, new ETD Guide sections should be added.

Table 2: DL modules for scholars and their mapping to the corresponding ETD Guide section (accessed at http://etdguide.org/etdguide.pdf)

DL Module	**ETD Guide section**
1-a(10-c):Conceptual frameworks, theories, definitions	1. Introduction: Purpose and scope of this document (page 10) 1.1. What are ETDs? (page 12) 1.1.1. ETDs as a new genre of documents (page 14)
2-c(8-c):File formats, transformation, migration	3.2.4 Preparing a PDF document (page 187) 3.2.4.2 PDF from LaTeX (page 188) 3.2.5 Preparing for conversion to SGML/XML (page 195)

	3.2.5.1 Preparing for conversion to SGML/XML from MS Word (page 200) 3.2.5.4 Preparing for conversion to SGML/XML in LaTeX (page 213) 4.2.2 Page description languages (PostScript and PDF) (page 248) 4.2.3.2 DTDs for ETDs (page 256) 4.2.3.4 Conversions from Word to SGML/XML (page 265) 4.2.3.4.2 Conversions to SGML/XML from LaTeX (page 276) 6.3 Managing technology changes (page 409)
3-b:Digitization	No corresponding sections
3-d:Document and e-publishing/presentation markup	3.2.1 Overview: writing with word processors and structured editors (page 155) 3.2.2 Writing in word processing systems (page 157) 3.2.2.1 Microsoft Word and Office 2000 (page 158) 3.2.2.1.1 Using style sheets (page 163) 3.2.2.1.2 Useful plug-ins for MS Word (page 165) 3.2.2.2 Corel WordPerfect (page 166) 3.2.2.3 LaTex (page 168) 3.2.2.4.2 Writing in Word processing systems: FrameMaker (page 181) 3.2.3 Writing directly in SGML/XML (page 184) 3.2.4 Preparing a PDF document (page 187) 3.2.4.2 PDF from LaTeX (page 188) 3.2.5 Preparing for conversion to SGML/XML (page 195) 3.2.5.1 Preparing for conversion to SGML/XML from MS Word (page 200) 3.2.5.2 SGML in WordPerfect (page 209) 3.2.5.4 Preparing for conversion to SGML/XML in LaTeX (page 213) 3.2.5.5 Checking and correcting (page 216) 3.2.6 Integrating multimedia elements (page 221) 4.2 Production of ETDs (page 244) 4.2.1 Overview: hardware, software, multimedia, scripts, encoding, document representations/conversions (page 245) 4.2.2 Page description languages (PostScript and PDF) (page 248) 4.2.3 Markup languages: SGML, XML (page 250) 4.2.3.1 Software (page 252) 4.2.3.2 DTDs for ETDs (page 256) 4.2.3.3 Support for students to write directly in XML (page 263) 4.2.3.4 Conversions from Word to SGML/XML (page 265) 4.3.5.3 SGML/XML overview (page 352) 4.3.5.3 SGML/XML (page 354)
4-b:Metadata, cataloging, metadata markup, metadata harvesting	3.2.7 Providing metadata – inside, outside documents (page 223) 4.1.3 Seamless access: Open Archives Initiative, federated search (page 241) 4.2.3 Markup languages: SGML, XML (page 250) 4.2.3.3 Support for students to write directly in XML (page 263) 4.2.4 Metadata, Crosswalks (page 281) 4.3.2 Metadata models for ETDs (page 296) 4.3.3 Cataloguing: MARC, DC, RDF (page 305) 4.3.4.1.6 Harvest usage in Germany (page 337) 4.3.4.1.7 The NDLTD union catalog (page 348) 4.3.5.1 Metadata (searching) (page 349) 4.3.5.3 SGML/XML overview (page 352) 4.3.5.3 SGML/XML (page 354)
4-d:Subject description, vocabulary control, thesauri, terminologies	3.3 Naming standards: file names and unique IDs, Australian digital theses program (227) 4.2.5 Naming standards (page 286)
5-c:Identifiers, handles, DOI, PURL	3.3 Naming standards: file names and unique IDs, Australian digital theses program (227) 4.2.5 Naming standards (page 286) 4.3.1 Identifying URN, PURL (page 294)
6-b:Search strategy, info seeking behavior, user modeling	1.3.6.1 Searching (page 33) 4.1.3 Seamless access: Open Archives Initiative, federated search (page 241) 4.3.2 Metadata models for ETDs (page 296) 4.3.4.1.6 Harvest usage in Germany (page 337)

	4.3.5.1 Metadata (searching) (page 349) 4.3.5.2 Fulltext (page 351) 4.3.5.4 Multimedia (page 370)
7-e:Web publishing (e.g., wiki, RSS, Moodle, etc.)	4.2.7 Packaging (page 289) 4.3.4.1 Packaged solutions (page 321) 4.3.4.1.1 DiTeD and DIENST (page 322) 4.3.4.1.2 ADT (page 328) 4.3.4.1.3 Cybertheses (page 331) 4.3.4.1.4 VT DB and other tools (page 333) 4.3.4.1.5 Library automation: OPACs, VTLS software (page 336)
9-b:DL case studies	5.1 Training the trainers: initiatives to support electronic theses and dissertation projects in Latin America (page 373) 5.3.1 Initiatives & projects (page 388) 5.4 Creating an online database of problem solving solutions (page 397) 5.5 Help develop a broad local team, Australian digital theses program (page 399) 5.6 Standards, cooperation and collaboration, Australian digital theses program (page 400) 5.7.1 Developing centers of expertise, Australian digital theses program (page 405)
9-e:Legal issues (e.g., copyright)	2.3.1 Intellectual property rights (page 71) 2.3.6 Plagiarism (page 93, no section number) 3.2.8 Protecting intellectual property / how to deal with plagiarism (page 226) 4.2.6 Encryption and watermarking (page 287)

5. Selected modules and their corresponding references

We have collected DL syllabi from accredited LIS and CS programs. Then their readings were retrieved and classified against our 10-module framework. The result for LIS reading classification was published in D-Lib Magazine [7] and CS reading classification results will be presented at JCDL 2007 [6]. In addition, those readings were downloaded into our server. If they were in HTML format, we converted them to PDF format for platform-independent access. We plan to create an annotated bibliography of those resources.

Table 3 shows the selected modules in the first column and their corresponding readings (only three readings were selected for each module for simplicity) from our syllabi reading collection. The table with the complete set of readings can be accessed from the 'Module Development' link of our project homepage, http://curric.dlib.vt.edu/.

Table 3: DL modules for scholars and their references (only three references per module are selected for simplicity)

DL Module	References
1-a(10-c):Conceptual frameworks, theories, definitions	• Alexa T. McCray and Marie E. Gallagher, "Principles for Digital Library Development," Communications of the ACM, Volume 44, Issue 5 (May 2001). (ACM DL) • Atkinson, Ross. (1996). Library functions, scholarly communication, and the foundation of the digital library: Laying claim to the control zone. Library Quarterly 66 (3), pp. 239-65. • Fox, Edward A., & Marchionini, Gary (Eds.). (2001). Digital libraries. Communications of the ACM, 44(5).
2-c(8-c):File formats, transformation, migration	• Witten, I.H., & Bainbridge, D. (2003). How to build a digital library. Morgan Kaufmann. (pp. 163-216) • Lawrence, Gregory W., Kehoe, William R., Rieger, Oya Y., Walters, William H., & Kenney, Anne R. (2000). Risk management of digital information: A file format approach. Washington, DC: CLIR.

	• Carl Fleischhauer (1998) Digital Formats for Content Reproductions. Library of Congress. http://memory.loc.gov/ammem/formats.html
3-b:Digitization	• Chowdhury, G.G. and Chowdhury, S. (2003). Introduction to digital libraries (Chapter 6. Digitization, pp. 103-119). London: Facet Publishing. ISBN 1856044653 • American Memory Project historic buildings. http://memory.loc.gov/ammem/hhhtml/hhdigit.html • Colorado Digitization Program. (1999). Questions to ask before starting a digitization program. Retrieved October 29, 2005, from http://www.cdpheritage.org/resource/introduction/questions.html
3-d:Document and e-publishing/presentation markup	• "A Gentle Introduction to XML," The XML Version of the TEI Guidelines. http://www.tei-c.org/P4X/SG.html • Meltzer, K. and Michalski, B. (2001). An XML and RSS Overview. InformIT. http://www.informit.com/articles/printerfriendly.asp?p=167784 • Tobin Nellhaus, "XML, TEI and Digital Libraries in the Humanities," *Portal* 1:3 (July 2001) http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v001/1.3nellhaus.html
4-b:Metadata, cataloging, metadata markup, metadata harvesting	• Grace Agnew, "Developing a Metadata Strategy," *Cataloging & Classification Quarterly* 36 (2003) 3/4, 31-46 • Burnett, K. Ng, K.B. & Park, S. (1999). A comparison of the two traditional metadata development. Journal of the American Society for Information Science, 50(13): 1209-1217. • Dublin Core Metadata Initiative. (2005). DCMI metadata terms. Retrieved October 29, 2005, from http://dublincore.org/documents/dcmi-terms/
4-d:Subject description, vocabulary control, thesauri, terminologies	• Hodge, G. (2000) Systems of Knowledge Organization for Digital Libraries: Beyond Traditional *Authority Files (chapters 1 and 4)* , CLIR, Washington • McCulloch, E.; Shiri, A.; Nicholson, D. (2005) Challenges and Issues in Terminology Mapping: A Digital Library Perspective. *The Electronic Library*. 23 (6), 671-677 • Columbia University Libraries Digital Program; Digital Library Data Dictionary http://www.columbia.edu/cu/libraries/inside/projects/metadata/dldd/
5-c:Identifiers, handles, DOI, PURL	• Clifford Lynch, “Identifiers and Their Role In Networked Information Applications” http://www.arl.org/newsltr/194/identifier.html • Sam Sun, Larry Lannom, and Brian Boesch. "Handle System Overview" http://www.handle.net/rfc/rfc3650.html • Persistent URL home page http://purl.oclc.org
6-b:Search strategy, info seeking behavior, user modeling	• C. Lee Giles, Kurt D. Bollacker and Steve Lawrence, "CiteSeer: an automatic citation indexing system", DL98, pp. 89-98. http://www.acm.org/pubs/citations/proceedings/dl/276675/p89-giles/ • Bandwell, Linda et al. (2004) The JISC User Behaviour Monitoring and Evaluation Framework. Journal of Documentation, 60 (3), 302-320. • Nicholas D, Huntington P, and Watkinson A. (2005) Scholarly journal usage: the results of a deep log analysis. *Journal of Documentation.* 61(2), 248 -280
7-e:Web publishing (e.g., wiki, RSS, Moodle, etc.)	• Blood, Rebecca. (2005)."Weblogs: A History and Perspective", Rebecca's Pocket.07 September 2000. February 17. http://www.rebeccablood.net/essays/weblog_history.html • Downes, Stephen. (2003). How to Create an RSS Feed with Notepad, a Web Server and a Beer. http://www.downes.ca/cgi-bin/page.cgi?db=post&q=crdate=1059503386&format=full • Tonkin, Emma (2005). Making the Case for a Wiki. January. Vol. 4.

	http://www.ariadne.ac.uk/issue42/tonkin
9-b:DL case studies	• Byrne, Alex. (2003). Digital libraries: Barriers or gateways to scholarly information? The Electronic Library, 21(5), 414-421. • Gregory Crane, Clifford E. Wulfman, and David A. Smith, "Building a Hypertextual Digital Library in the Humanities: A Case Study on London", JCDL01, 2001. (ACM DL) • O'Leary, M. (2003). The many meanings of ICDL. Information Today, 20(9), Pp.41-46.
9-e:Legal issues (e.g., copyright)	• AHDS. AHDS copyright page. Available online at: http://ahds.ac.uk/copyrightfaq.htm. • Kahle, B., et al. (2001). Public access to digital material. D-Lib Magazine, (October). • Pritcher, L., (2000). Ad*access: seeking copyright permission in the digital age. D-Lib Magazine, 6(2).

6. Summary

We provided our latest 10-module framework which covers most of the topics in DLs and their surrounding environment. This is our base to build DL educational lesson modules for students and scholars. From those modules, we chose eleven modules which we think are the most relevant to scholars' research endeavors. Then those eleven modules' descriptions, their mapping to ETD Guide sections, and their corresponding readings from our syllabi reading collection, were presented in Tables 1, 2, and 3. It is our hope that scholars who are not familiar with ETDs and NDLTD but who want to find relevant ETDs for their research and/or submit their ETDs will benefit from this paper.

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