INSC 590: Problems in Information Sciences
Topic: Metadata
Fall 2017

The School of Information Sciences (SIS)
College of Communication and Information (CCI)
The University of Tennessee

Class Meetings: Thursday 6:30-9:10 pm Eastern,
on Zoom https://tennessee.zoom.us/j/102984450

Instructor: Jeffrey Pomerantz
450 Communications Bldg.
Office Hours: By appointment, since I don’t have an office on campus
jeffrey@pomerantz.name
1345 Circle Park Drive
Knoxville, TN 37996-0341
SIS Office: 865.974.2148
Fax (SIS): 865.974.4667

COURSE TIMELINE

Class meets via Zoom on Thursdays from 6:30 pm until 9:10 pm Eastern. The first day of regularly scheduled class is 24 August 2017; our last day is 30 November 2017. I will log on to Zoom 10 or 15 minutes before class, as often as I can (though this may not always be possible); you are welcome to do the same, and treat that time as office hours. All times in this syllabus are for the Eastern time zone.

COURSE DESCRIPTION

This course explores the role of metadata in our evolving information ecosystem(s); an emphasis is placed on metadata the digital environment. The course examines the development and use of metadata schemas in distinct information communities (e.g., digital libraries, museums, and archives; scientific data centers; governmental organizations; educational and learning environments; commerce enterprises; and personal information systems -- to name only a few). Among selected topics covered are interoperability, metadata models, ontologies, metadata for the semantic web, metadata generation, metadata and search engines, metadata quality, and the evaluation of metadata schemas and tools. The course introduces enabling
technologies used to create machine-understandable metadata (e.g., XML and RDF). Exercises and assignments provide practical experience.

STUDENT OUTCOMES

By the end of this course, students will:

- Understand the role of metadata for organizing resources, and for facilitating resource discovery, particularly in the digital environment.
- Understand the range of functions metadata supports, including resource preservation, management, authentication, use, and other activities.
- Gain familiarity with a wide range of metadata standards, and understand the different applications and functions for these standards.
- Acquire basic skills for developing and implementing a metadata schema.
- Evaluate metadata and metadata applications.
- Consider a theoretical context for metadata and the future of metadata.

REQUIRED TEXT


This book is freely available online. If you really hate reading online, or just love dead tree technology, you can buy a print copy here.

RECOMMENDED TEXTS


Yes, I wrote this book. I’m not going to require you to buy it, because it feels weird to require my students to buy my own book. (Though I know I wouldn’t be the first professor to do so.) Still, I strongly recommend it, since the structure of the book closely mirrors the way I teach this course. Which is not an accident. In other words, the course and the book are complementary. Plus, it’s likely to be the least expensive textbook you ever buy. If you feel moved to buy the book, here’s a link to Amazon, and to MIT Press. That said, the UTK Library has copies, and I’ve asked them to purchase a few more.


The companion website to this book contains the table of contents, readings, and exercises. I strongly recommend this book. Especially if you see yourself doing
metadata-related work in the future, this one is well worth having on your shelves. The UTK Library also has copies of this book.

COMMUNICATION

I am required to communicate with you through your UTK email address. If you prefer to use another address, consult the OIT Helpdesk to obtain directions for forwarding your UTK mail to your preferred address if you don’t wish to check both accounts.

This course will blend synchronous and asynchronous elements of online teaching and learning. Here is my plan for which components of the course will be in which mode:

Synchronous:
- Class meetings
- Collaboration on project work

Asynchronous:
- Some content delivery via video micro-lectures, prior to class meetings
- Discussion in threaded forums

COMPUTING REQUIREMENTS

In order to participate fully in this course, you will need to have access to a computer, with high-speed internet access, a webcam, and a microphone.

You must have adequate computing skills, including but not limited to use of word processing, web browsers, email, listservs, Canvas, and Zoom software. You must learn how to submit your assignments using Canvas. The Office of Information Technology (OIT) provides training classes in using varied technologies for students at no charge (advance registration is required).

You must obtain a UT email account and subscribe to the SIS student listserv. In addition, you must have the PowerPoint Reader or the regular PowerPoint software installed on your computer in order to download the lecture notes from Canvas.

CLASS ATTENDANCE POLICY

It is assumed that each student be present and speak in class – the equivalent of a B grade for “participation.” Missing more classes or failing to participate will lower your grade; frequent participation will raise the grade.
Regular attendance is required and necessary. A substantial portion of your grade will be based on in-class work and participation. Unexplained absences will affect your grade. Contact me as soon as possible if you cannot attend class. If you will be absent from class, you must:

- Inform me in advance or as soon as possible after class
- Submit any work due from the missed class period
- Listen to class recording
- Obtain notes, handouts, etc. from Canvas
- Check with classmates for notes, announcements, etc.

Acceptable reasons for absence from class include:

- Illness
- Serious family emergencies
- Special curricular or job requirements (e.g., judging trips, field trips, professional conferences)
- Military obligation
- Religious holidays
- Participation in official university activities such as music performances, athletic competition or debate
- Obligations for court imposed legal obligations (i.e., jury duty, subpoena)

Severe weather is probably an acceptable reason for absence from your other courses. But that is not the case here, as class sessions for this course are entirely online. Unless severe weather conditions knock out your internet access or electricity, in which case contact me as soon as you are back online.

Missing more than one class meeting for reasons other than those listed above will have a negative impact on your course participation grade.

INCLEMENT WEATHER

“The chancellor (or appointed representative) may officially close or suspend selected activities of the university because of extreme weather conditions. When a decision to close is made, information is distributed to the campus community, shared with local media, and posted on the front page at utk.edu.” (http://safety.utk.edu/emergency-management/inclement-weather-policy/)

SIS will cancel classes when UT is closed. Please check the SIS student listserv (UTKSIS-L@LISTSERV.UTK.EDU) for messages about closing.

DISABILITIES THAT CONSTRAIN LEARNING
Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Disability Services (ODS) at 865-974-6087 in 100 Dunford Hall to document their eligibility for services. ODS will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities.

CIVILITY

Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability and courteousness. Civility enhances academic freedom and integrity, and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other’s well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus: http://civility.utk.edu/

CCI DIVERSITY STATEMENT

The College of Communication and Information recognizes that a college diverse in its people, curricula, scholarship, research, and creative activities expands opportunities for intellectual inquiry and engagement, helps students develop critical thinking skills, and prepares students for social and civic responsibilities. All members of the College benefit from diversity and the quality of learning, research, scholarship and creative activities is enhanced by a climate of inclusion, understanding and appreciation of differences and the full range of human experience. As a result, the College is committed to diversity and equal opportunity and it recognizes that it must represent the diversity inherent in American society. The College is acutely aware that diversity and fairness are foundations that unite the College’s faculty, staff, students, and the larger communication and information community.

ACADEMIC INTEGRITY

Students should be familiar and maintain their Academic Integrity described in the Academics section of Hilltopics:

Study, preparation, and presentation should involve at all times the student’s own work, unless it has been clearly specified that work is to be a team effort. Academic honesty requires that the student present their own work in all
academic projects, including tests, papers, homework, and class presentation. When incorporating the work of other scholars and writers into a project, the student must accurately cite the source of that work. For additional information see the applicable [catalog](http://www.lib.utk.edu/instruction/plagiarism) or the [UT Libraries site](http://www.lib.utk.edu). See also [Honor Statement](http://www.lib.utk.edu/instruction/plagiarism).

Students should abide by the Honor Statement described in the [Academics](http://www.lib.utk.edu/instruction/plagiarism) section of Hilltopics:

An essential feature of the University of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.” See the applicable [catalog](http://www.lib.utk.edu/instruction/plagiarism) for student and faculty responsibilities under the Honor Statement.

### PLAGIARISM

Plagiarism in any of its several forms is intolerable, and attention to matters of documentation in all written work is expected and required. Inadvertence, alleged lack of understanding, or avowed ignorance of the various types of plagiarism are not acceptable excuses.

Specific examples of plagiarism are:

1. Copying without proper documentation (quotation marks and a citation) written or spoken words, phrases, or sentences from any source;
2. Summarizing without proper documentation (usually a citation) ideas from another source (unless such information is recognized as common knowledge);
3. Borrowing facts, statistics, graphs, pictorial representations, or phrases without acknowledging the source (unless such information is recognized as common knowledge);
4. Collaborating on a graded assignment without the instructor’s approval;
5. Submitting work, either in whole or in part, created by a professional service and used without attribution (e.g., paper, speech, bibliography, or photograph).

Students who may be unsure of the nature of plagiarism should consult the instructor or a guide for writing research reports. (Additional resources are available at [http://www.lib.utk.edu/instruction/plagiarism](http://www.lib.utk.edu/instruction/plagiarism))

Infractions of academic integrity are penalized according to the severity of the infraction but may include a course grade of “F.”

### ASSIGNMENTS AND GRADING
Student work is assigned a grade based on quality of thought and writing style, thoroughness of research and of references, appropriateness of length, and originality. Only exceptional work will receive an "A" grade. Assignments that are received after the due date will be assigned a lower grade than would otherwise be received. All sources must be cited, quotations must be in quotation marks and attributed correctly. Not doing so constitutes plagiarism.

PREPARATION OF WRITTEN WORK

1. Please use APA citation style.
2. All sources must be cited, quotations must be formatted and attributed correctly. Not doing so constitutes plagiarism.
3. Grades for assignment submissions that include incomplete in-text citations or reference lists will be lowered by one-half grade level (e.g., an assignment that would have received 17/20, or 85/100: B, will be lowered to 16/20, or 80/100: B-).
4. All assignments must be word-processed and include your name, date, and course number.

DUE DATES AND LATE ASSIGNMENTS

Assignments should be submitted to the “assignments” area of Canvas and are due (officially) at 11:59 p.m. EST on the due date listed on the syllabus. I will download the submissions from Canvas early the next morning. I will ONLY download assignments from Canvas ONCE. Therefore, if your assignment is not ready by the deadline…

- You must send me an email informing me that your assignment will be late. Not doing so will result in a one-point deduction for each day I don’t hear from you.
- When it’s ready, you must submit it to me via email, as an attachment
- One point will be deducted for each 24-hour hour period the assignment is not turned in.

INCOMPLETES

Based on adopted University of Tennessee-Knoxville and SIS policy, a grade of I (Incomplete) is reserved for emergencies that prevent the student from completing the course on time. Incompletes are granted only under "the most unusual of circumstances" and solely at the discretion of the instructor. Plan your semester's course of study carefully to insure sufficient time to complete the required work.

For students who simply "disappear" without contacting the instructor and without completing the required form, an "F" is submitted.
ASSIGNING GRADES

Please note that I do not assign letter grades for individual assignments, but will mark your paper with my comments and provide a point score based on the possible points earned for that assignment. If you’d like to compute a letter grade based on the score provided, divide your score by the total points possible for the assignment and refer to the scale below for the corresponding letter grade. For example, if you earned 23/25 points on an assignment, your percentage grade would be 92. Your final grade will be based on total points earned/total possible points over the course of the semester.

EVALUATION

Semester grades will be assigned according to the following scale:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Score Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≥93</td>
<td>(4 quality points per semester hour) superior performance.</td>
</tr>
<tr>
<td>A-</td>
<td>90-92.75</td>
<td>(3.7 quality points per semester credit hour) intermediate grade performance.</td>
</tr>
<tr>
<td>B+</td>
<td>88-89.75</td>
<td>(3.5 quality points per semester hour) better than satisfactory performance.</td>
</tr>
<tr>
<td>B</td>
<td>83-87.75</td>
<td>(3 quality points per semester hour) satisfactory performance.</td>
</tr>
<tr>
<td>B-</td>
<td>80-82.75</td>
<td>(2.7 quality points per semester credit hour) intermediate grade performance.</td>
</tr>
<tr>
<td>C+</td>
<td>78-79.75</td>
<td>(2.5 quality points per semester hour) less than satisfactory performance.</td>
</tr>
<tr>
<td>C</td>
<td>70-77.75</td>
<td>(2 quality points per semester hour) performance well below the standard expected of graduate students.</td>
</tr>
<tr>
<td>D</td>
<td>60-69.75</td>
<td>(1 quality point per semester hour) clearly unsatisfactory performance and cannot be used to satisfy degree requirements.</td>
</tr>
<tr>
<td>F</td>
<td>≤59.75</td>
<td>(no quality points) extremely unsatisfactory performance and cannot be used to satisfy degree requirements.</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td>(no quality points) a temporary grade indicating that the student has performed satisfactorily in the course but, due to unforeseen circumstances, has been unable to finish all requirements. An I is not given to enable a student to do additional work to raise a deficient grade. The instructor, in consultation with the student, decides the terms for the removal of the I, including the time limit for removal. If the I is not removed within one calendar year, the grade will be changed to an F. The course will not be counted in the cumulative grade point average until a final grade is assigned. No student may graduate with an I on the record.</td>
</tr>
<tr>
<td>Grade</td>
<td>Description</td>
<td>Notes</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>S/NC</td>
<td>(carries credit hours, but no quality points) S is equivalent to a grade of B or better, and NC means no credit earned. A grade of Satisfactory/No Credit is allowed only where indicated in the course description in the Graduate Catalog. The number of Satisfactory/No Credit courses in a student's program is limited to one-fourth of the total credit hours required.</td>
<td></td>
</tr>
<tr>
<td>P/NP</td>
<td>(carries credit hours, but no quality points) P indicates progress toward completion of a thesis or dissertation. NP indicates no progress or inadequate progress.</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>(carries no credit hours or quality points) indicates that the student officially withdrew from the course.</td>
<td></td>
</tr>
</tbody>
</table>

**COURSE EVALUATION**

You will be invited to evaluate the course at the end of the term. Please participate in this valuable process. I also invite your comments throughout the course and read all comments, suggestions, and recommendations.
ASSIGNMENTS: DESCRIPTION

This table provides a summary of assignment names, due dates, and points. A fuller description of each assignment follows.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Dublin Core Records</td>
<td>20</td>
<td>21 September</td>
</tr>
<tr>
<td>Environmental Scanning</td>
<td>10 (2 reports at 5 points per)</td>
<td>28 September and 26 October</td>
</tr>
<tr>
<td>Create schema.org Microdata</td>
<td>30</td>
<td>12 October</td>
</tr>
<tr>
<td>Invent a Metadata Schema</td>
<td>40</td>
<td>30 November</td>
</tr>
<tr>
<td>Participation</td>
<td>10</td>
<td>30 November</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>110</strong></td>
<td></td>
</tr>
</tbody>
</table>

Environmental Scanning

Metadata is all around us, all the time, though often invisible or behind the scenes. This assignment requires you to peer behind the scenes, and identify examples of metadata in use.

For this assignment, you will conduct continuous environmental scanning in the broad arena of metadata, with the goal of informing yourself and your classmates. Throughout the semester, you should monitor a range of sources of information relevant to this course: about metadata generally, but also about the many and varied technologies and standards that we will address. The news is a good source for these examples (for example, the NSA collecting phone records is the biggest example of metadata making the national news that I can remember). But also check websites, blogs, and news announcements; monitor user and developer forums; subscribe to listservs, RSS feeds, and Twitter accounts; etc. I would also encourage you to actively participate in any venues to which users may contribute: pose questions on user forums, have conversations with organizations on Twitter, etc. Then digest this information and provide the class with brief posts about new developments in the world of metadata.

These posts must be written individually. Every student must make at least 2 environmental scan posts to the course. More would be fine, of course, if there is especially interesting news to report. Since you presumably have no way to control what is in the news about metadata, you may post at any time up to and including the due date for these posts. I would encourage you to not wait until the last minute do this assignment: the more spread out over the course of the semester these posts are, the more useful they are for their purpose of keeping us all informed. Post in the Environmental Scan forum.
Two good examples of environmental scans in a library context are the Pattern Recognition report by OCLC, and the Transformational Times report by ARL. Your environmental scans should not be this formalized, or this long. But these reports provide good examples of the methodology used in environmental scanning.

Create Dublin Core Records

Create Dublin Core metadata records for the following types of resources:
1. An item-level metadata record for a static resource. For example, a journal article (e.g., something from First Monday) or a book (e.g., Metadata by Zeng and Qin).
2. A collection-level metadata record. For example, for the journal First Monday, or a digital collection (e.g., Postcards from the Great Smoky Mountains).

You must create your records according to the following two standards:
1. In HTML, per the Expressing Dublin Core metadata using HTML/XHTML meta and link elements document
   - i.e., <meta name="DC.title" content="Moby-Dick; or, The Whale" >
2. In XML, per the Guidelines for implementing Dublin Core in XML
   - i.e., <dc:title>A Heartbreaking Work of Staggering Genius</dc:title>

Feel free to use a Dublin Core generator to help you create your records.

I strongly recommend that you validate your XML record using the W3C Markup Validation Service.

For your metadata records, you must:
- Use as many of the 15 DC elements as you can.
- Demonstrate that you understand element (property) repeatability.
  - Include at least 4 refinements and 3 encoding schemes. For your refinements and encoding schemes select:
    - DCMI Metadata Terms, and/or
    - Dublin Core Metadata Registry (browse: Vocabulary Encoding Schemes)
  - You may select other encoding schemes not represented in the “terms” namespace.
- You may include elements beyond the 15 included in the DCMES, if you want to select elements from the DCMI Metadata Terms.
Create schema.org Microdata

Mark up (at least) one page of your personal website with schema.org microdata.

If you don’t have a personal website, you should, so create one. IMHO you can learn HTML in about an hour. But you don’t really need to: there are about a brazillion HTML editors out there, as well as about the same number of content management systems, both which you can evaluate according to any number of criteria.

Select at least 3 of the more specific types under the Thing type (Action, CreativeWork, Event, etc.) for which to include microdata in your page(s). Drill down into these 3 types: some are several layers deep (e.g., Thing > Place > AdministrativeArea > Country). Select at least 2 types in each branch, for a total of at least 6 types. Include microdata for these (at least) 6 types in your personal webpage(s).

I strongly recommend that you validate your schema.org markup using the Google Structured Data Testing Tool.

Submit a link to the webpage (or links to the webpages) to which you have added schema.org microdata.

Note: Perhaps, for whatever reason, you’re not comfortable editing your actual, live personal website for a course assignment. (You don’t want search engine crawlers to find an under-construction site, you don’t want your personal site to contain semantic markup, whatever.) In that case, feel free to create alternate “sandbox” versions of the pages you’ll be editing for this assignment, and submit links to those.

Invent a Metadata Schema

Invent your own metadata schema, to describe any type of resource of your choice, and create all the supporting files to make your schema viable.

This assignment is similar to the Constructing a mini classification schema project from IS 520, Information Representation and Organization.

You must:

1. Develop a set of elements to describe some type of resource. Feel free to use the schema you created in 520.
2. Articulate values for your elements. You may refer to pre-existing controlled vocabularies or encoding schemes, if appropriate ones exist, or create new ones yourself. Values for one or more elements may be uncontrolled, but use
sparingly. (In other words, only use uncontrolled vocabularies for elements that really need it, like Abstract or Title.)

3. Create a DTD for your element set. You must refer to the appropriate namespace(s). Validate your XML using the W3C Markup Validation Service.

4. If necessary, create a namespace file.

5. Create an XML record for an object of your choice, using your metadata schema. Validate your XML record using the W3C Markup Validation Service. Validating your DTD and XML record together is recommended.

Thus, there are 4-5 deliverables for this assignment:

1. Your element set.
2. Documentation of the controlled vocabularies for each of your elements. This should take the form of:
   a. The name of a pre-existing controlled vocabulary, or
   b. A thesaurus or encoding scheme of your own invention.
3. An XML record for an object, making use of your element set & values from your controlled vocabulary.
4. The DTD supporting your element set.
5. (optional) A name space document, if you wrote your own.
## SCHEDULE

See the UTK [Academic Calendar](#)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic &amp; Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 August</td>
<td><strong>Introduction to the Course / Metadata History</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reading:</strong></td>
</tr>
<tr>
<td></td>
<td>• Syllabus, Assignments, &amp; Schedule</td>
</tr>
<tr>
<td>31 August</td>
<td><strong>Dublin Core</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reading:</strong></td>
</tr>
<tr>
<td></td>
<td>• <em>Dublin Core Metadata Element Set, Version 1.1</em></td>
</tr>
<tr>
<td></td>
<td>• <em>DCMI Metadata Terms</em></td>
</tr>
<tr>
<td></td>
<td>• <em>Interoperability Levels for Dublin Core Metadata</em></td>
</tr>
<tr>
<td>7 September</td>
<td><strong>Structured Data</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reading:</strong></td>
</tr>
<tr>
<td></td>
<td>• <em>Introduction to Structured Data</em></td>
</tr>
<tr>
<td>14 September</td>
<td><strong>XML</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reading:</strong></td>
</tr>
<tr>
<td></td>
<td>• XML in a Nutshell, 3rd ed., Ch 1 &amp; 2.</td>
</tr>
<tr>
<td>21 September</td>
<td><strong>schema.org and other Microdata</strong></td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>28 September</td>
<td>Linked Data</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5 October</td>
<td>No class: Fall Break</td>
</tr>
<tr>
<td>12 October</td>
<td>Interoperability part 1: Getty</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>19 October</td>
<td>Interoperability part 2: Crosswalks &amp; Harvesting</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>26 October</td>
<td>PREMIS and Provenance</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2 November</td>
<td>Metadata Encoding and Transmission Standard (METS)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>9 November</td>
<td>DPLA MAP &amp; EDM</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>16 November</td>
<td>Evaluating metadata</td>
</tr>
<tr>
<td>23 November</td>
<td>No class: Thanksgiving</td>
</tr>
<tr>
<td>30 November</td>
<td>Course wrapup</td>
</tr>
</tbody>
</table>

**DISCLAIMER**

Please be aware revisions may be made to this syllabus over the course of the semester, and as such, the content contained within may be subject to change.