Integrated Learning of Metadata Quality Evaluation and Metadata Application Profile Development in a Graduate Metadata Course

Poster

Oksana L. Zavalina
University of North Texas, USA
Oksana.Zavalina@unt.edu

Abstract

This report describes an experiment in the design of an advanced graduate metadata course to facilitate more efficient link between content-based learning and skill-based learning. The experiment included integrating the process of designing a local metadata application profile with learning evaluation of metadata quality, including leaning to assess the ability of a standard metadata scheme or an application profile to capture and adequately represent important and unique attributes of information objects in a special collection. The benefits of this approach are discussed.

Keywords: metadata education; metadata application profiles; metadata evaluation; metadata quality.

1. Introduction

The landscape of metadata work has changed dramatically in the recent two decades and continues to rapidly evolve. Ability and willingness to learn and flexibility are now among the most often required traits for metadata specialists. As a result of the shift to knowledge-based economy, one of the two integral components of knowledge – skills – needs to receive more emphasis in designing the educational programs than previously when education was more content-focused. Professional associations such as Association for Library Collections and Technical Services publish information on the skillsets for metadata professionals. The skills that the employers are looking for in metadata specialists have been examined by the studies analyzing job ads and other related materials (e.g., Hall-Ellis, 2006; Han & Hswe, 2010; Park & Lu, 2009). Surveys of metadata practitioners and metadata educators (e.g., Hider, 2006; Hsieh-Yee, 2004; Park & Tosaka, 2010) identify metadata quality evaluation skills as one of the priorities in metadata education. Several in-depth case studies (e.g., Glaviano, 2000, Hsieh-Yee, 2000; Or-Bach, 2005) contribute to understanding of how the metadata skills are developed through assignments and other course activities. However, none of them focused on the skills of growing importance: metadata quality evaluation and metadata application profiles development. We attempt to address this gap in the project briefly presented below.

2. Course Design for Learning Metadata Quality and Application Profiles

The University of North Texas (UNT) graduate students are offered a selection of six metadata courses. Four graduate courses focus on various aspects of Machine-Readable Cataloging (MARC) metadata and/or classification systems used in libraries. The remaining two graduate courses represent a sequence of an introductory and advanced metadata courses. Students take the advanced metadata course after completing the introductory course in which they learn about the structure of metadata schemes, metadata elements, semantics, and syntax, familiarize through readings and practice with the use of HTML and XML in metadata records, develop theoretical and practical understanding of Dublin Core, Metadata Object Description Schema (MODS), and Visual Resources Association's VRA Core 4.0 metadata and one of the existing metadata

application profiles:(Dublin Core Collections Application Profile (DCCAP). The more complex topics such as principles guiding creation of metadata application profiles (MAPs) and the process of building MAPs, along with other important advanced topics such as metadata quality, metadata interoperability, and expression of metadata as Linked Data, are covered in the advanced metadata course.

The advanced metadata course design experiment includes close integration of course topics through the sequence of assignments, in which the work students completed as part of one assignment informs the work completed in the next assignment. The content-based and skills-based learning on the topic of MAPs are separated in time. The content knowledge is delivered early in the semester, when students learn about MAPs through instructor's lectures and required readings, and discuss their understanding of the principles guiding MAPs development and characteristics of existing MAPs in the course discussion forums. The MAPs learning module is followed by the metadata quality learning module, and the learning module on metadata in digital content management. In the major assignment which culminates the semester, the MAPs skill building is integrated with content knowledge and skills obtained in all learning modules.

The experiment mainly focuses on two major assignments: Metadata Evaluation and Documentation, and Metadata Application Profile. In the Metadata Evaluation and Documentation assignment, each student collects their own two small random samples of metadata records (created according to a local version of qualified Dublin Core) from two digital collections available through the Portal to Texas History: a baseline collection and a target collection. Students analyze metadata quality in these records in relation to the major criteria of completeness, accuracy, and consistency (as defined by e.g., Bruce & Hillmann, 2004; Moen, Stuart, & McClure, 1998), both within each sample and comparatively across the two samples; and write a summary of comparative metadata evaluation results. After completion of metadata evaluation tasks, students draft metadata creation guidelines for the target collection. This task is informed by student metadata evaluation findings, as well as their understanding of the specific attributes of information objects in the collection and the ability of the given metadata scheme to accommodate representing these attributes.

In creating metadata documentation, students use as the starting point the existing guidelines for the baseline collection. The process involves categorizing information in the existing guidelines document into three categories: applicable to representing objects in the target collection, conditionally applicable, and those completely inapplicable. The criteria used in selecting a baseline collection included students' familiarity with the collection, availability of detailed collection-specific metadata creation guidelines, and collection homogeneity. All students in advanced metadata course had previous exposure to this homogenous collection which consists of a single type of information objects (patents) in the capacity of metadata creators through one of the exercises in the introductory metadata course. In the process of creating metadata records in the introductory course, students developed understanding of patents and gained familiarity with metadata guidelines for collection.

The criteria for selecting a target collection include homogeneity of collection, the absence of collection-specific metadata creation guidelines, and the mostly visual nature and short content length of items which expedites the process of evaluating information objects and representing them with metadata. In the initial course offerings, a collection of postcards had been used but later the institution contributing collection to the aggregation expanded the collection scope by including other types of information objects. As the postcard collection lost its homogeneity, determining typical collection-specific item attributes and meaningfully comparing this collection with a homogenous patent collection became impossible. For that reason, in the latest iteration of the course design a collection of architectural drawings was used as a target collection. Architectural drawings were deemed the optimal point of comparison to patents for the course exercise purposes due to similarities between the two types of information objects.

In the previous offerings of the course, students completed the readings and discussions of the MAPs and the practical exercise closer to the beginning of the semester: prior to learning about metadata quality, evaluating metadata quality and developing metadata creation guidelines. Each student was assigned their own small collection to design a metadata application profile for. This approach, however, was found to lack continuity: while the students developed understanding of and interest in MAPs and other advanced metadata topics, their ability to clearly see the connections between these topics – especially the connections between the design of a MAP on one side and developing the guidelines for metadata creators and evaluating the quality of resulting metadata on another side – was not adequately supported by the practice. Therefore, the decision was made to more closely integrate the course topics through the sequence of assignments, in which the work completed as part of one assignment would inform the work completed in the next assignment and the issues encountered in the later assignment would give students a chance to reflect to the topic of the earlier assignment. In the most recent iteration of the course, students complete the Metadata Application Profile assignment at the end of the semester, after having developed the content knowledge on MAPs and other course topics and having completed and received instructors' feedback on other skill-building practical assignments, including the Metadata Evaluation and Documentation exercise. In designing their own MAP for architectural drawings, students build on their previous work on evaluating architectural drawings, as well as on assessing the suitability of a specific MAP – used in the Portal to Texas History for describing materials in all collections – for represent architectural drawings.

The latest version of Metadata Application Profile assignment consists of three parts. In the first part, students estimate the target audience for architectural drawings and compile a list of the attributes that will likely be of importance to the target audience. Next, students introduce the metadata elements to represent these attributes, and provide specifications for each element. The minimum requirement for the MAP is to consist of at least 17 metadata elements, including each of these three categories:

- applicable for describing architectural drawings existing metadata elements adopted from two (2) or more standard metadata schemes, including but not limited to Dublin Core,
- existing element(s) adapted – with modifications for representing the architectural drawings – from standard metadata schemes, and
- new local metadata element(s) defined by students.

Students make decisions on definitions, vocabulary control and cardinality of each metadata element, as well as on mapping to standard elements, on the order of elements in the record. They are also asked to express the element names with namespace the way they would be expressed in a DSpace-powered digital repository, using the solutions to overcome the problems with DSpace accommodation of hierarchical metadata schemes (based on what students learned in another learning module in this course).

In Part 2, students express the MAP design ideas resulting from completing Part 1 as a data model in the RDF/XML. For this task, students are instructed to use as a template a copy of the 2012-06-14 release of DCMI Metadata Terms data model (http://dublincore.org/2012/06/14/dcterms.rdf). In the final section of the assignment, students test the resulting MAP. For this purpose, students follow the specifications of their own MAPs to create a metadata record describing one familiar architectural drawing from the sample analyzed in Metadata Evaluation and Documentation exercise. This allows to see the connection between theorizing and implementing a specific MAP, to discover practical problems with implementing the MAP designed in Part 1 and Part 2 and to fix them as needed based on the test results.

To support the learning, a substantial amount of time in the weekly class meetings is devoted to discussion of student ideas for and challenges in the process of the architectural drawings MAP development and the ways in which their design is informed by their findings on existing

metadata quality in the collection of architectural drawings. Course discussion forums are also extensively used for discussing these issues and establishing connections between MAP design and implementation and developing and using guidelines for metadata creators, and importance of metadata quality evaluation.

3. Conclusions

The redesign of advanced metadata course described in this report was based on the assumption that revisions would improve the overall quality of learning – and skill-building in particular – as well as student satisfaction. The data collected as part of this experiment allows to make the conclusion that this assumption was correct. The average quality of student work in both Metadata Evaluation and Documentation exercise and Metadata Application Profile exercise (as expressed in assignment submissions assessment) has improved after implementing the course design change; this improvement was the most noticeable for metadata quality learning: from 89.6 to 94.88 out of 100. The average quality of student learning on these and other advanced metadata topics, as evaluated by the teaching team and expressed in semester grades, has also improved. Student evaluation of the course also shows the benefits to the quality of learning. Student perception of two indicators – (1) usefulness of written (skill-building) assignments in understanding of the course content, and (2) overall course quality – has substantially improved (by 9.52%).

When detailed description and results of this project are published, we expect this will make a contribution to understanding of efficient approaches to developing crucial skills in the process of providing graduate education to metadata professionals. Hopefully, it would encourage other course developers and instructors of metadata courses to share their best practices. The platform for sharing these ideas and learning objects would be very beneficial in improving the quality of metadata education.

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