Chapter 4
Creating High Quality Learning Object Metadata Based on Web 2.0 Concepts

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ABSTRACT

When introducing the metadata standard LOM, objectives such as the ability to find or to reuse learning objects were followed. These objectives are actually achieved in LOM to a limited degree only, despite the designation as de-facto standard for description of electronic learning content. Based on the complexity of the standard, a high theoretical potential faces rejection in practice. One reason for this is that the process of metadata generation—for example, who creates which metadata attributes—is not defined in detail yet. This paper illustrates an approach which guarantees a high quantity as well as a high quality of learning object metadata records, bringing together known ways of metadata creation and the new paradigm of users describing content as implemented in recent Web 2.0 applications. In the context of a concrete e-learning platform, we exemplarily illustrate who creates which metadata records of LOM in which way at what time. Finally, we show why this approach of creating metadata matters as we measure our metadata quality and compare it with other's findings.

INTRODUCTION

Electronic Learning, in particular in the form of Blended Learning, is applied by a rapidly increasing number of universities and companies. Realizing the concept of learning objects (Wiley, 2002) the ability to find and reuse content is generally based on the use of metadata. Due to its wide dissemination IEEE LOM (http://ltsc.ieee.org/wg12/20020612-Final-LOM-Draft.html) can be considered as de-facto standard: With more than 40 attributes, subdivided into 9 main categories, a broad description of learning objects is enabled. Metadata is collected and stored in a central place, making

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content available for potential users. In this way transparency of existing e-learning content and its integration within varying context is enabled (Dahl and Vossen, 2007).

While the great number of attributes enables a detailed description of learning objects, in practice a comprehensive usage of these is rare. Studies show that common attributes like *title* or *format* are filled quite often, while fields like *difficulty* or *structure of learning object* receive only little attention (Friesen, 2004). As long as metadata is only used in a single context respectively in a single system, a reduction of the attribute amount might even be reasonable, as the focus can be set regarding the specific end user (Dahl, Vossen and Westerkamp, 2006); by doing so, complexity is decreased and usability increased. Problems arise if repositories communicate and interact with each other, for example when querying distributed e-learning catalogues: While on the one side metadata records might be considered as crucial and obligatory, the same attributes might never be used on the other side as they are only optional. With a small intersection of filled metadata records the primary objectives like finding and reusing learning objects become impossible to achieve. Furthermore, if metadata is created the way it is mostly today a high risk for superficial records arises when a single person tries to fill as many metadata fields as possible: In result a high quantity might face a low quality. In order to enable cross-system finding and cross-system reusability of learning objects, a high quantity along with a high quality of metadata must be guaranteed, which actually seldom is the case.

Thus, the core dilemma of learning object metadata creation is derived from the discrepancy between the high potential of LOM in theory and the rare implementation and usage of the complexity in practice. We put this down to the aspect that a crucial question is not answered yet:

Who *creates* ***whenwhich metadata records*** *in* ***which way****?*

Though it is obvious that a single person is hardly predetermined to fill in all metadata records (e.g., presented in some kind of list with empty text fields) this approach can indeed be found in practice. However, we often see different sources interacting within the process of metadata generation. In order to be able to find and reuse, it has to be defined in detail which records are generated by whom at which time and in which way. Only in this way a high quantity along with a high quality of metadata can be achieved.

With the objective to define the process of learning object metadata generation for a concrete learning context at a university, the remainder of this paper is structured as followed: In Section 2 we examine in which way metadata for learning objects can actually be created. Furthermore the Web 2.0 tagging approach introducing the user of a system as metadata creator within a community is analyzed. Section 3 brings together the different ways of metadata creation in a single model and draws first conclusions regarding actors within the process of learning object metadata creation (answering *who?*). Furthermore, we disengage the well known structure of LOM with its nine main categories; instead we introduce a view founded on a more classical metadata perspective. This view, breaking up the original LOM hierarchy, reveals groups of metadata records that might be generated together in the same way (answering *which metadata records?*). Section 4 describes in a real world scenario the use of a learner-centered e-learning platform; in a process model it is shown where metadata is created before and during the usage of learning objects (answering *when? / in which way?*). Section 5 then illustrates technical aspects behind this process model, as the 'big picture' of the interacting applications as well as the modular core component of metadata creation are discussed in detail. Finally, Section 6 focuses on measuring the created metadata: Applying the LOM quality metrics we show why our approach described in this paper really matters. Concluding