Preliminary Discussion on a Digital Curation Framework for Learning Repositories

Nikos Palavitsinis[1;2], Nikos Manouselis[1], Salvador Sanchez-Alonso[2]

[1]Greek Research & Technology Network (GRNET), Greece

{palavitsinis; nikosm}@grnet.gr;

[2]University of Alcala de Henares (UAH), Spain

{palavitsinis; salvador.sanchez}@uah.es

Abstract. Learning Object Repositories have met significant development during the last few years. Researchers have extensively discussed the concept of learning objects and their accompanying metadata. Metadata in specific, were introduced and developed by the community of librarians for cataloguing purposes. From the same background, digital curation has emerged as a field of research directly linked to the needs of preserving large datasets over time and platforms. This paper links digital curation with learning objects and mostly discusses the process of digital curation whereas at the same time, attempts to identify possible research directions for digital curation in LORs.

Keywords: learning resources, curation, metadata, lifecycle

1 Introduction

Learning Object Repositories (LORs) are databases used for storing and/or enabling the interoperability of Learning Objects (LOs) as defined by McGreal [13]. Because not all repositories store the actual object files, a key function of repositories is to identify the storage location of the objects and provide an indexing system that enables the efficient search and discovery of the objects [16]. A growing body of learning repositories is making digital learning resources available to the user searching for educational content on various topics, through learning repositories (i.e. MERLOT, MIT's OpenCourseWare, ARIADNE, LRE for schools, Organic.Edunet, MACE Project).

This vast amount of objects calls for specific actions to maintain them over their lifecycle and make them available for current and future generations [2]. Addressing this issue, the term "Digital Curation", which implies a transfer of existing curatorial approaches from analogue resources to their digital counterparts, was introduced at the "Digital Curation: digital archives, libraries and e-science seminar" in 2001.

Beagrie [2] defines "Curation" *as the actions needed to maintain digital research data and other digital materials over their entire life-cycle and over time for current and future generations of users*. Pennock [14] quotes that *Digital Curation is about maintaining and adding value to a trusted body of digital information for both current and future use*, adding the aspect of added value in the process of Digital Curation.

In a comprehensive paper, Campbell [3] identified some of the issues that need to be taken into account when considering the Digital Curation of both learning objects and the metadata that describes them. Specifically, Campbell concluded by pointing out that it is certain that the use of digital objects to facilitate teaching and learning will continue to grow and that the metadata requirements of the communities of practice that use these resources will become increasingly complex.

Building on this notion, this paper emphasizes on the importance of Digital Curation on Learning Object Repositories (LORs) and suggests the use of the DCC Curation Lifecycle Model [10] in Learning Repositories.

To this direction, the first section provides definitions to set a common level of understanding on the basic concepts used in this paper while the second section presents in detail the Digital Curation process through existing work and discusses the notion of applying such techniques to Learning Object Repositories. Finally, the last section identifies limitations of the specific research and suggests future directions of research.

2 Background

The term Digital Curation implies not only the preservation of digital resources or the maintenance of a collection to keep it accessible but it also includes some degree of added value and knowledge [2][8]. Curation actions can be carried out on a broad range of scientific data and resources in multiple disciplines, ranging from arts & humanities to life sciences, physical sciences, medical sciences etc [1] to all stages of the digital resources' lifecycle [10]

In general, digital learning resources are significantly different when compared to digital datasets that are used in sciences such as physics, astronomy, biology, etc. This difference also stems from the specific nature of learning object metadata as IEEE [11] states these should take into account *"the diversity of cultural and lingual contexts in which the learning objects and their metadata will be exploited"*. Supporting this, McGreal [12] stated that *LOs can be defined as any reusable digital resource that is encapsulated in a lesson or assemblage of lessons grouped in units, modules, courses, and even programmes*. Polsani [15] defined reusable learning objects (RLO) as *independent and self-standing units of learning content predisposed to reuse in multiple instructional contexts*. These definitions emphasize on the educational uses of learning resources, already providing some evidence as regards their unique characteristics.

3 Digital Curation Framework for Learning Object Repositories

The DCC (Digital Curation Centre of the University of Edinburgh) Curation Lifecycle model (Fig. 1) is an existing curation model that can be used for curation actions as it is generic enough to be applied to different contexts and serve different communities. Additionally, the authors feel that the generic nature of DCC Curation Lifecycle Model can serve as a basis for elaborating on some initial thoughts on curation issues in LORs, providing the ability to apply them to similar models dealing with digital curation.

The DCC Curation Lifecycle Model (DCC-CLM), provides a graphical high-level overview of the stages required for successful curation and preservation of data from initial conceptualization or receipt. The authors feel that each stage of the DCC-CLM should be carefully examined, always taking into account the specificity of LORs and LOs to identify challenges and issues that may arise for digital curation in the case of LORs. Examining the model in such a way, could possibly indicate whether or not curation actions will be needed for educational resources in contrast to the scientific data already being largely curated.

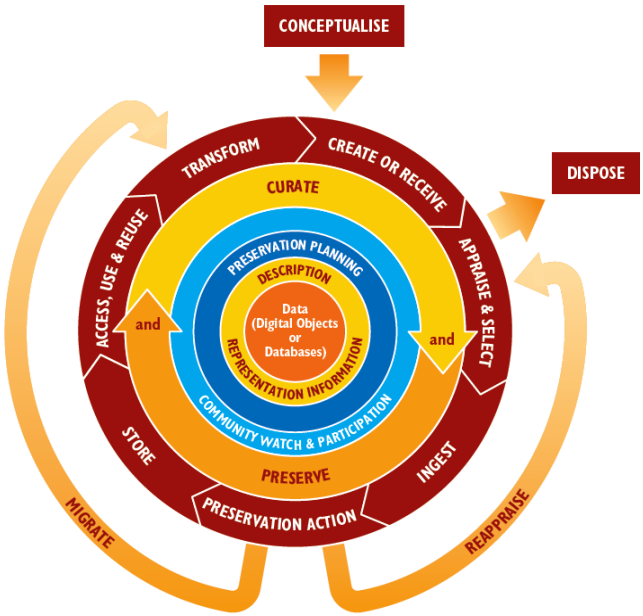

Fig. 1. DCC Curation Lifecycle Model as defined by Higgins (2008)

Lastly, even if, the model presented may not be one hundred percent applicable to the case of learning resources and learning repositories, but may as well present specific challenges for applying parts of the model in LORs. An important research question has to do with the degree to which existing metadata standards and specifications,

store preservation data for the learning resources. Because if specific preservation actions are proven to be relevant for learning resources as well, then for sure, existing standards should be capable of storing such data. This and similar issues will be further analyzed in future, more extensive studies.

4 Conclusions and Limitations of the Study

The present paper opened a discussion on whether or not Digital Curation can take place in the context of LORs. Overall, this paper attempted to build upon relevant studies on digital curation issues for educational metadata. By doing so, the authors attempt to open a discussion on whether or not, digital curation or some key processes it involves are relevant for Learning Object Repositories.

The first limitation of this paper lies within Digital Curation itself, as it is yet an emerging field with many different contributions from a great number of scientists that make it even more difficult to define concepts and theories. Another important limitation of this paper lies in its theoretical nature. This fact is mainly attributed to the need for an initial discussion, even on a theoretical level, on some potential research directions which will be documented in follow-up papers and examined in depth through case studies on existing LORs.

Future research that will extend the initial findings of this paper will focus on specific steps of the DCC Curation Lifecycle Model, reviewing existing literature from the curation experts as well as the learning repository ones, trying to also quantitatively prove that digital curation is significant as a context-specific curation. Once this is proven, future directions will include composing a DCC Curation Lifecycle Model for Learning Object Repositories.

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