

About Material and Immaterial Creation

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Abstract

The notion of creation is a key concept of cultural-historical documentation in museums and archives, but also of metadata for traditional library and Digital Library objects, including all kinds of scientific achievements. Nevertheless, the concept is regarded to be intuitively clear, objective and simple and as such its use in documentation seems to be mostly unreflected. In reality, it is surprisingly complex and can be quite subjective. In this paper, we analyze the problems of creating an ontology of material and immaterial creation for the purpose of integrating information from cultural-historical and scientific documentation into coherent knowledge resources and propose an initial model relating immaterial and material creation in a consistent way and identify areas for further research.

The notion of creation is a key concept of cultural-historical documentation in museums and archives, but also of metadata for traditional library and Digital Library objects, including descriptions of all kinds of scientific achievements. Nevertheless, the concept of creation is regarded to be intuitively clear, objective and simple and as such its use in documentation seems to be mostly unreflected. In reality, it is surprisingly complex and can be quite subjective, as for instance with a reconstructed ancient vase or a poem on a Chinese painting. There arise questions about the sense in which something comes into existence: Can the same object take part twice in a creation and at the same point in time represent the result of both events? Are the notions of identity, substance and existence relative to classes of things? Is there an objective distinction between modification and creation? Other questions have to do with the physicality of the creation of immaterial items: Do thoughts take final shape during writing physically? What about oral tradition? How does the modeling of artifacts from intellectual creation processes affect the notion of physical creation?

This paper builds on intermediate results from the Working Group on the Harmonization of the CIDOC Conceptual Reference Model (ISO21127) and IFLA's FRBR (Functional Requirements for Bibliographic Records), the most prominent formulations of museums and library conceptualizations respectively.

The CIDOC CRM [1] describes physical creation as *E12 Production*, which brings into existence new instances of "E24 Physical Man-Made Thing", comprising discrete objects as well as instances of "E26 Physical Feature", such as inscriptions. A physical object or feature is thought to exist beginning with the unique process of its creation until its unique destruction, possibly undergoing multiple modifications in between. In the CRM, E12 Production IsA E11 Modification, in the sense that physical creation always implies modifying matter. The latter has been controversial, and never been fully analyzed in its consequences. On the other side, an event of kind "E65 Creation" is regarded to bring an immaterial item into existence. The CRM assumes that an immaterial object must reside at least on one physical carrier. This does not mean that the substance of the immaterial

object depends in any way on the carrier, but it is rather a constraint on where it exists. For instance, the non-smoking sign may be found on many different things. The actual connection of the immaterial Creation to a physical item has however been left open to either multiple instantiation of suitable CRM classes or extensions of the CRM.

FRBR [2] describes a completely idealistic chain of intellectual products from the idea (Work), over the text (Expression) down to the book (Manifestation) and the copy (Item) in my hands. The chain is described statically, i.e. without explicitly referring to the specific processes involved. Following CRM recommendations, the harmonization group developed the ontology FRBR_{oo}, which interprets the explicit and implicit concept of FRBR in a formal way. It makes these processes explicit and therefore is in a need to describe the connection of material and immaterial creation. This model is based on the following idea:

In FRBR_{oo} we now assume that thoughts, as long as they are not formulated explicitly, exist in a somehow volatile form. We regard *F30 Work Conception* as the activity which starts the interior mental process, as long as we can speak at all of a discrete time when the idea for a work is substantiated. In most cases, the initial idea may not be distinct enough to be regarded as an event in a historical sense.

The earliest moment, in which no one can doubt the completion of an intellectual creation, is given when - in whatever sense – a complete idea, text, picture etc. is being transferred to a carrier different from the creators own mind, be it a piece of paper, a prison wall, or the mind of another person by talking. We called this process of transfer the *first externalization* or *F31 Expression Creation* and regard it as a good objective notion of immaterial creation for cultural-historical documentation. It can only take place, when at least a second physical carrier is present. It is compatible with this view to assume, that the intellectual creation process in a wider sense starts with the conception and ends with the first externalization.

Therefore, *F31 Expression Creation* IsA *F30 Work Conception* and *E12 Production*. This model describes well writing manuscripts. In case of electronic means, the created file instance on a particular storage volume might be regarded as new Physical Feature, a view justified by the physical changes actually taking place on a storage medium, which can be found, identified and physically be destroyed. In cases of creating a human memory in oral tradition, the model sounds rather counterintuitive.

In the sequence, a series of ontological questions arise:

If, strictly taken, the text is a feature on a sheet of paper, it would be the ink and not the paper, that makes up the manuscript, in contrast to common documentation practice. However in case of the Chinese painting, we may not want to regard the poem as being isolated from the painting. On the other side, if we regard that writing on the paper transforms an object into a new one, we disregard the continuity of the painting collecting comments over the centuries. This view is described in the CRM by the class *E81 Transformation*. If we identify on the other side the notion of creation as modifications

changing the category of an object, without affecting a common supercategory, we introduce a relative notion of identity which David Wiggins [3] vehemently argues against. Nevertheless, the latter seems to save the monotonicity of reasoning in information integration. We suspect that the inclusion hierarchy of the respective life-time intervals of an object that can be seen as different objects under different categories is isomorphic to the IsA relations between these categories. This could be a starting point for temporal reasoning with a relative notion of creation.

What about the creation of a statue? Is it immaterial-material or just material? Does it help reasoning to distinguish creative work from non-creative one, or does material creation generally have immaterial aspects? What is the relation between a class of physical objects, such as all copies of statue, and the shape of it as a particular design object? Is the creation of a statue different from creating linguistic or other symbolic representations with respect to reasoning about immaterial content? Is the taking of a digital photography or any automated scientific data taking an immaterial creation?

Another severe problem is the fact that immaterial items do not change like material ones, even though the illusion firmly sits in our minds: A material object has a unique world-line in space-time. Any change makes the previous form disappear. The notion of diachronical identity of continuants or endurants under change makes sense due to the fact that normally each phase has only one successor. If we assume that an immaterial item must reside on a physical carrier, but can reside on any number of carriers at the same time, any change of the immaterial content on one carrier strictly speaking creates a new object, normally called a “version”, whereas the original continues to exist on all other carriers. No action would change all copies at once. If we however assume a change that does not affect its substance (such as the font of this text), we are in a similar problematic of relative identity as described above, because the very same item can be regarded as to represent two things: The text with its lay-out and the text without lay-out. The case is further complicated by the fact that the actual equivalent to the word-line of a material item is a derivation graph.

Finally there is the question, if immaterial objects are detected or created, what would be the utility of each view and if it is possible to make practical distinctions. In historical reasoning, the fact that two parties know the same information is normally taken to be a proof for a communication chain between those and a source for chronological reasoning. It is one of the goals of the CIDOC CRM to enable such kind of reasoning. In this case, one would assume a unique original source of information. In the other view, the immaterial object may have multiple roots. Does it make sense to classify things into those that are likely to be redetected and those that are not? How do we model the carrying, transfer and possible transfer of information? Is it a kind of modification?

Even though the above questions may be subject of endless and undecidable philosophical debate, we believe that the task of information integration for cultural-historical research and e-science provides a functional framework specific enough to objectively criticize the fitness of the different approaches to support the required kinds of reasoning and to separate domains in which the different assumptions hold better or

worse. Ultimately, this task of ontology engineering is not to find the absolute truth, but to find models and domains in which the expected deviations of reality from automated reasoning based on these models will be rare enough to be tolerable. This position has nothing to do with the widely assumed idiosyncrasy of ontological modeling, but advocates an empirical approach. In this sense, we regard the solutions of the above questions as a reasonable research agenda.

[1] Doerr, M., "The CIDOC CRM – An Ontological Approach to Semantic Interoperability of Metadata", *AI Magazine*, 4(1), 2003.

[2] IFLA Study Group on the Functional Requirements for Bibliographic Records, "Functional Requirements for Bibliographic Records : Final Report" (UBCIM publications ; N.S., Vol. 19), K.G. Saur, München, 1998
ISBN 3-598-11382-X

[3] Wiggins, David, *Sameness and Substance Renewed*, Cambridge University Press, 2001, ISBN 0521456193.