Museographic Transposition: The Didactic Engineering of a Science Museum Exhibit

1. Background and Rationale

The objectives of science museums are often stated in terms of visitor learning outcomes. The primary medium of a museum's educational activities is the exhibition. However, there is little research available to exhibition designers on how to achieve visitor learning outcomes, and exhibition engineering, i.e. the process of originating, developing a plan for, and implementing an exhibition, thus remains largely based on the tacit professional knowledge of museum staff rather than theoretical underpinnings or empirical evidence.

The quantity alone of museum research carried out in the last decades seems to contradict this statement. However, the applicability of this work to exhibition engineering is restricted by two characteristics: First, the focus of this work is the visitor rather than the exhibition. Second, the research seeks to describe strategies for supporting museum learning that are independent of the exhibition's content and thus broadly generalisable.

It is not surprising that museum research devotes considerable attention to the visitor; the visitor, after all, is the justification for the existence of any exhibition. However, the physical exhibition, not the visitor, is the only thing over which the exhibition engineer has direct control, and the application of findings pertaining to the visitor can only indirectly influence exhibition engineering. Furthermore, the underlying assumption of finding content-independent education strategies is that incorporating these strategies into exhibition design will precipitate visitor learning regardless of the subject matter of the exhibition. Yet, research shows that thinking and problem solving are always modulated by the content of the task at hand (Schauble et al., 2002), and as a consequence, general recommendations and guidelines are insufficient when it comes to designing teaching about a given topic in detail (Andersson & Wallin, 2006). In short, to conduct research that is applicable to the engineering of educational exhibitions, a content-specific, exhibition-centred approach is needed.

2. Purpose and Framework

The purpose of the study reported here is to take a first step towards a content-specific **prescriptive** model of exhibition engineering. This is done by constructing a **descriptive** model of an actual case of exhibit engineering. The development of this model is framed by the research question: *What is the nature of the constraints and opportunities which govern the putting-into-exhibition of a specific object of knowledge?*

This study analyses the engineering of the existing exhibit *Cave Expedition* from an epistemological perspective using Chevallard's (1991) notions of knowledge ecologies and didactic transposition. Chevallard uses the metaphor of ecology to describe the contexts within which knowledge exists ('lives'). An object of knowledge is adapted to its particular context ('ecology') and cannot be directly transferred from one context to the next. Instead, it must undergo a process of deconstruction and reconstruction in order to make it viable in its new context. When this deconstruction and reconstruction takes place in order to create an object of teaching from an object of knowledge to be taught, the process is called didactic transposition (Chevallard, 1991).

Applying the framework of didactic transposition to the process which creates a museum exhibit from knowledge in the scientific discourse yields the framework of museographic transposition (Simonneaux & Jacobi, 1997). Museographic transposition often comprises two moments of knowledge transformation: from the scientific discourse to the curatorial brief (an exhibition planning document), and from the curatorial brief to the physical implementation of the exhibition (Author, 2008) (Figure 1).

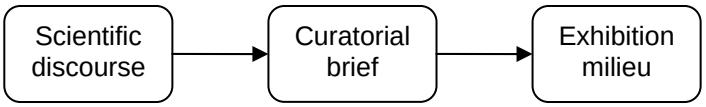

Figure 1. *Museographic transposition of an object of scientific knowledge. The object originates in the scientific discourse, is deconstructed and reconstructed for inclusion in the curatorial brief, and is again deconstructed and reconstructed to form the physical, three-dimensional exhibition milieu.*

Each of the contexts transited by an object of knowledge in the process of museographic transposition is considered a separate ecology; thus the scientific discourse, the curatorial brief, and the exhibition milieu each comprise their own knowledge ecology. These ecologies framed the analysis of the engineering of the exhibit *Cave Expedition* as described in the following.

3. Methods

The procedure used in the study reported here aimed to analyse the museographic transposition of the specific object of biological knowledge exhibited in *Cave Expedition*, namely *the blind cave beetle and its adaptations to its environment of permanently dark caves* (in the following abbreviated as 'the object of knowledge'). A preliminary analysis yielded the conditions that characterised each of the contexts of the transposition: the scientific discourse, the curatorial brief, and the exhibition milieu. For example, in the scientific discourse, e.g. within primary and secondary literature, the theme of an animal's adaptations to its environment is approached systematically by the analysis of a) the characteristics of the environment of the species in question, b) the morphological, physiological, and behavioural traits of the species, and c) the interactions between the species' traits and the environment's characteristics (cf. Culver, 1982).

In contrast, the knowledge ecology of the exhibition milieu, which in this case was an immersion type exhibit, was shaped by three principles: a) the presentation of the exhibit as a coherent whole with all the exhibited objects supporting the reconstruction of a reference world, b) the integration of the visitor as a component of the exhibit, and c) the consequent dramatisation of matter and message (Belaën, 2003).

The second part of the procedure built upon the above-described elucidation of the knowledge ecologies to analyse, in each ecology, the elements of the object of knowledge present there. This content analysis thus comprised a study of the primary and secondary research literature dealing with the object of knowledge, a study of the curatorial brief *Xtremes: Storyline for an exhibition about adaptations to extreme environmental conditions on Earth* (Executive Committee, 2005), and a study of the physical exhibit *Cave Expedition*. This analysis thus yielded both the content and the structure of the knowledge elements present in each of the knowledge ecologies.

Finally, the two moments of knowledge transition (i.e. from scientific discourse to curatorial brief and from curatorial brief to exhibition milieu) were investigated through open-ended interviews with the exhibition engineers.

4. Results

The museographic transposition of the object of knowledge *the blind cave beetle and its adaptations to its environment of permanently dark caves* was found to take place in two moments. In the first moment, simultaneous processes of epistemological development and museum-pedagogical development resulted in the selection of the content that formed the curatorial brief. The second moment described a museographic development in which this content was transposed into the physical exhibit. The putting-into-exhibition of the object of knowledge *the blind cave beetle and its adaptations to its environment of permanently dark caves* was thus found to be informed and constrained by epistemological, museum-pedagogical, and museographic factors at different stages in the engineering process.

According to this model of exhibition engineering, the integrity of the exhibition milieu depends on the integrity of its component parts. Ideally, each of these component parts should grow from the intersection between a specific element of scientific knowledge and a specific element of the exhibition objectives as specified in the curatorial brief. Where a component is not supported by both scientific knowledge and exhibition objectives, the component in question may undergo an imperfect museographic development and run the risk of compromising the integrity of the exhibition milieu.

5. Conclusions and Implications

The descriptive model of exhibition engineering constitutes a first step towards systematic studies of the process of exhibition engineering. Applying the model in its present form to the case of the exhibition unit *Cave Expedition* illustrates how the integrity of the exhibition milieu may be analysed and understood in terms of its components and their origins. The model may thus be used as an instrument with which to identify exhibition inconsistencies, but more importantly, it may be used to generate new ideas for exhibition design. Plans to investigate visitor interactions with and understanding of the exhibition unit *Cave Expedition* will expand the descriptive model of exhibition engineering into a prescriptive model for exhibition engineering.

6. Bibliography

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