MUSEUMS, ENVIRONMENTS, INFORMATION

Alexander Koutamanis

Associate Professor of Computational Design, Faculty of Architecture & the Built Environment, Delft University of Technology, a.koutamanis@tudelft.nl

Abstract: Modern digital media already permeate the physical world. The portability of information devices and the ubiquity of networks allow us to access information practically anywhere, creating digital overlays on reality. This also allows us to bring information we routinely archive in museums and collections back to the built environment, and so develop new opportunities for interaction, mostly with historical data that otherwise often remain invisible or intractable. Recently there has been increased interest in the narratives presented through these digital overlays. It is proposed that in augmented reality the narratives refer to the relation between environment and information, and in particular on the paradigmatic and syntagmatic dimensions of this relation.

Keywords: augmented reality; information; syntagmatic dimension; paradigmatic dimension

Introduction: Artificial Places

We take them for granted but on closer inspection museums are strange places. Considering how they have evolved from cabinets of curiosities and similar haphazard, arbitrary and semi-educated collections, today’s museums are certainly impressive. Society acknowledges that: every city feels they simply need their museums; we invest heavily in them; we assign to them cultural and educational purposes; we expect them to contribute substantially to the preservation and dissemination of their subjects.

Figure 1: Changing visitor behaviour: a few years ago many visitors at a major art museum would just take a snapshot of each important exhibit before moving to the next item on their checklist; today they turn their back to the exhibits to take a selfie. Few have the interest, time or opportunity to study the exhibit (photo by the author).

Still, like zoos, museums can cause mixed feelings – both ideologically and experientially. They are artificial places, produced by the superimposition of layers that are not always necessary or appropriate but follow custom and vogue. Even a keen museumgoer might admit that peeling away those layers reveals that as user experience, museums can be interchangeable with zoos or cinemas (Fig.1). An architect would probably agree that the same applies to museums as design assignments.

Museums are also changing – arguably faster in recent years – as they are under pressure from a world culturally and economically evolving, as well as heavily networked, where everything seems to be easily accessible (Alexander and Alexander, 2008). Above all, they are changing as a result of modifications and switches in the behaviour of their visitors who appear to be adapting with speed and ease to the opportunities and limitations of this world.

Aspects and Types

Viewed as environments, certain aspects and types of museums can help us understand how we design not only museums but also information systems that relate to their content and purpose.

Architecture

Architects visiting a museum are often biased: in addition to the museum exhibits and sometimes more than in these exhibits (the content), they are interested in the building (the container), and observe it much more critically than other visitors. But one does not have to be an architect to realize that museums tend to be prominent buildings, born out of pride – civic or other. Either old and adapted to this use or purpose-designed, they belong to the architectural jewels of any city or town. Even museum extensions often form major architectural works, possibly attracting even more attention than the existing building by their innovative or even controversial form, as e.g. in the Louvre. It is not uncommon that the architecture becomes integral part of the museum’s identity, even dominating it, as one might suggest for the Bilbao Guggenheim. It can become an uneasy relation, even antagonistic, that...
may distract visitors’ attention and interaction with the content of a museum (Fig.2).

Figure 2: Sometimes the visitor does not know where to look: at the exhibits or at the splendour of the museum building (photo by the author).

Tschumi’s New Acropolis Museum in Athens borrows from the real Acropolis not only to claim similarity but also to stress certain aspects of the ancient building in relation to exhibits (Fig.3, 4).

Experience

Trying to immerse visitors in a particular atmosphere is particularly popular with certain types of museums (e.g. natural history) that require exhibits to be presented in a specific context because otherwise they would be less informative. This can turn into a simulation where visitors act as invisible observers. It can also be a recreation in a more abstract manner, involving interpretation – not just as a matter of artistic license but also as an opportunity to guide visitors and explain certain concepts (Figs.3, 4).

A particular case in this category is architecture: buildings preserved and exhibited so that people can see and experience them. They can be typical buildings of a period or region, or notable buildings, i.e. architectural monuments. In such cases, emphasis can be on architecture itself or as the container of cultural patterns (form or function).

Market Hall

This may be the dominant paradigm for museums: if exhibits are what matters, and the building is there to serve them and the visitors who want to view the exhibits at leisure, from all angles and without any obstacles, the museum becomes a market hall, where people go from stall to stall. A market hall museum does not have to be coherent; we do not seem to need coherence to move from one exhibit to another, as we can form binary associations between the previous and the next (Fig.5).

Figure 5: Sverre Fehn, Exhibition pavilion at the Norwegian Museum of Architecture, Oslo: a market hall of architectural models (photo by the author).
Interaction is often a major feature of such environments, as in educational or technological museums. But even without interaction, many museums assume the spatial organization of a market hall, presumably because it agrees with a neutral view of the relation between building and exhibits, allowing more room for exploration by the visitors.

Spill-out

Some museums spill out of their buildings, sometimes on purpose, e.g. so as to attract visitors, but more often because of the affordances of the immediate environment, i.e. as an opportunity or out of necessity. For example, the Kröller Möller museum is well-known for its sculpture park. Although low-brow and not normally classed with museums, thematic parks build on the same idea to good effect, if one is allowed to judge by popularity and activity. Similarly, zoos often follow the same principle, by turning the market hall into a market place, although the current emphasis on natural environments impedes discerning the stalls (Fig.6).

Virtual Museum

Virtual museums are mostly websites that offer overviews and appetizers for the real museum, sometimes with advanced technologies and clever combinations but mostly through standard web facilities. While these websites do not impress as replacements or simulations of the real thing, they address the issues of pre-visiting and post-visiting. Especially the former is an apparent necessity for most travellers and visitors: a guidebook is not opened when we arrive at a destination, it is first used for preparing and planning the visit. This is further stimulated and supported by the Internet and its multiplicity of sources, to a far greater extent than with guidebooks (Kuflik et al., 2015).

A closely related subject is the use of digital technologies to enrich and expand museum activities through Internet technologies, including the ubiquitous social media. Museums obviously have to keep up with socio-technological developments in order to reach and satisfy their changing public (Bautista, 2013).

Environments and Information

What we learn from these aspects and types is that museums are artificial environments, often recreating the splendour of high-class buildings like stately homes and palaces for reasons of civic, personal or corporate pride. They have to be prominent landmarks – and not just for their content: the built environment is more than a shelter for collections and exhibits; it also organizes our experiences and introduces additional aesthetic and symbolic layers. At the same time and for more or less the same reasons, museums are strange places that routinely contradict affordances (our perception of actionable properties of an environment): we are expected to look at the exhibits only and do so from a respectful distance or behind protective devices, even when they are everyday things (Fig.7).

As a result of all that, museums have the capacity to make us forget ourselves, to absorb us in what they offer (both the exhibits and the stories they try to tell), even to become magical places. They present to us a combination of environment and information that stimulates our perception in several complementary, mutually reinforcing or even contradictory ways.
**Augmented Reality**

The interplay of environment and information is interesting beyond the conventional confines of museums. In recent years there is increased interest in a kind of reversal concerning architecture: not collecting information in a museum but bringing it back to the built environment. Modern digital media already permeate the physical world. The portability of information devices and the ubiquity of networks allow us to access information practically anywhere, creating digital overlays on reality (Deligianni and Papaioannou, 2014). This goes beyond virtual museums and museum apps (Chen et al., 2014, Chang et al., 2014), becoming a new form of spill-out that makes information accessible in the actual place it refers to, enriching the experiences of viewing, touching, walking through or even smelling a building – interacting with it in any way possible (Reunanen et al., 2015).

Such attempts have been variably seen as simple digitizations of architectural guidebooks or, at the other extreme, as liberation from the artificiality of museums, in a different yet similarly motivated process to the switch from buildings to natural environments in zoos. In all cases, it is a fascinating interplay of environment and information, especially in relation to the current interest in narratives and the importance of understanding how people perceive environments (including information).

Artificial environments have the advantage of structuring experience and guiding perception to specific narratives. They may do it by reducing everything in a prescriptive or proscriptive manner but quite often they manage to combine the total experience with a narrative. The main premise of what we can learn from museums is that a meaningful experience relies on the effective combination of environment, information and perception (Fig.8). The environment is not just a metaphor for the user interface, as in a website, or the background against which information is perceived but an equal partner, another information source. This is a particularly applicable to architectural subjects but arguably also expands beyond these.

In this framework, design often concentrates on the relation between environment and information: on the development of hybrid environments that support new perceptions and new narratives. Achieving this depends on our understanding of the dimensions of the combination: the semantic dimension concerns meaning (e.g. the meaning of a sentence), the paradigmatic the components (the words) and the syntagmatic the order of these components (the sequence of words in a sentence) (Fig.9).

![Figure 9: Dimensions of information and its relation to the environment.](image)

A common occurrence in the development of augmented reality systems of historical or similar information for the built environment is that people initially focus on the semantic dimension: they are in a hurry to present their conclusions, the narratives they have formed, often in years of painstaking research. However, when we start parsing these narratives for the purposes of implementation, it is not uncommon that the systems under development become research tools rather than presentations: emphasis may shift to the paradigmatic dimension, to the components of the narrative and the information items that have to be made explicit on screen and juxtaposed to the real environment.

At this point, museums often become an explicit or implicit reference: focusing on a single building at a time follows the market hall pattern, allowing users to roam; the real building can become the dominant subject, turning everything else into annotations: support for the narrative the building could probably provide just by itself; or, users can be offered the experience of a simulation of a layer of buildings hidden under the current situation. All that seems to matter is making the right information available in the right correlation with the environment. Interestingly, the latter is approached mostly semantically/holistically, not as a collection of explicit parts (paradigmatically).

Inevitably, as we arrange information items or as we move from one to another in use, whether in a market hall pattern or in a simulation, we encounter the syntagmatic dimension: not only in the sequence of reading something or visiting different buildings but also in the relations between items. As in

![Figure 8: The main components of an augmented reality system for the built environment.](image)
language, the sequence of words is not accidental but subject to syntactic and grammatical constraints. So, in a market hall visitors can easily create their own narrative (usually variations, although omissions can be critical). This is more difficult in a simulation, although we should not forget that relations between information and environment are also part of the syntagmatic dimension.

Much of the above echoes observations known from e.g. montage studies but the constraints of augmented reality frequently impede transfer of knowledge from such areas. Quite often a solution is found through the introduction of what might be called ‘mixed media’: paradigmatic elements with a syntagmatic working – the equivalent of road signs (Koutamanis, 2010).

**Discussion**

With the pace of current development in mobile device software and hardware, any research into augmented reality can only be considered as work in progress: most systems developed have to remain adaptable and expandable to accommodate changes in the facilities and exploit new opportunities. Even key modules and unique features may be replaced at short notice, e.g. for reasons of conformity to new platform constraints.

The content of the systems may also change after the initial development – and not only in technical terms (e.g. higher resolution images) or through the addition of new information (a common occurrence nowadays, as any online system effectively invites worldwide user feedback). Any implementation that starts faithful to the semantic dimension is confronted with new insights produced by the paradigmatic and syntagmatic dimensions of the resulting digital system, which may stimulate rapid redevelopment along different lines.

We have to appreciate that the key to what happens in such cases may be far removed from earlier environment/information combinations (including museums), which have worked admirably well but may now be less relevant or at odds with new information habits and patterns of use people develop contrary or beyond design intent, as suggested by social constructivism. The focus consequently shifts to what people do now (and this changes very rapidly) and new roles for information. The developers’ challenge becomes not only to accommodate known user preferences but also to create hybrid environments that stimulate new user behaviours through meaningful relations between environment and information.

**References**