MIXED MEDIA VISUALIZATIONS IN DIGITAL ANALYSES OF ARCHITECTURAL WORKS: Applicable Lessons for the Arthur and Yvonne Boyd Education Centre Analysis Case Study

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Abstract. This paper considers how available technologies and media from different disciplines may be applied in the analysis of architecture; it attempts to refine and redefine the current representation techniques in the discipline to enhance the quality of understanding of the built-form through the computer screen. The authors' current research case study, the analysis of The Arthur and Yvonne Boyd Education Centre, is used to illustrate some approaches and issues.

1. Introduction

Architecture relies heavily on published analyses to provide an in-depth understanding of completed design work, often using them as surrogates to impractical on-site studies. The majority are still in the form of printed texts supported by drawings, photographs and/or diagrams. One of their problems is the non-transparency in the architectural information delivered. There have been several digital architectural analyses completed in the past, largely confined to formal and/or spatial studies of architectural works, for example Mishima and Szalapaj (2001) and Sass (2001). However, there seems to be no clear sign of a major paradigm shift to take full advantage of digital tools in analyzing architecture. Apart from the fact that it requires a considerable grasp of the technologies and their concepts, a new mode of delivery may need to be invented. As Manovich aptly pointed out, "Yet while new media strengthens existing cultural forms and languages...it simultaneously opens them up for redefinition" (Manovich, 2001).

With that issue in mind, the authors' research looks beyond what is currently available within the discipline to redefine and fill the gaps needed to present architectural analyses in the ever promising electronic 'flatland' – a term used by

E. Tufte (1990) to describe the print media and video screen.

2. Mixed Digital Media

While the mixes of different cultural eras are visible in post-modern architecture, the representation of architecture seems to have also entered a vaguely similar 'post-modern' phase.

The notion of 'mixed digital media' (terms like 'multimedia' and 'multiple media' are sometimes used as synonyms) can be interpreted in three ways. Firstly, it could simply mean the assembly of materials of exclusively digital origins, digitally created sounds, texts or images from digital video and photos. For instance, some media artists use the technique of combining various digital forms to create a representative interpretation of the world they see. Here, the alluring concept of the externalization of the psyche (Manovich, 1995) is exploited through the use of digital production media. Although the possibility of externalizing the psyche is questionable, a digital ensemble does allow an alternative outlet for artistic expressions.

Secondly, as Manovich suggests, the term can imply the 'remix between the interfaces of various cultural forms and the new software techniques' (Manovich, 2003). Technology allows this interaction of different cultural forms by providing a new kind of playing field where traditional forms of media are digitised, transformed and combined. Digital architectural photo montage, for example, brings and manipulates an architectural conceptual idea which could originally be in the form of painting, airbrushes or three-dimensional model into a photograph of the building's context/environment.

Thirdly, 'mixed media' also encompasses the 'borrowing' and mixing of digital media tools/concepts, and wherever possible, digitalised traditional/new techniques deployed in other disciplines. This may act as a catalyst to change the way media is viewed and utilized in the architectural field. It suggests the readaptation of concepts to serve purposes other than those for which they were originally intended. In the area of software technology Glanville (1995) refers to the use of software for a purpose outside its originally intended use as 'software abuse'.

3. Examples: Mixes in Digital Architectural Analysis of the Arthur and Yvonne Boyd Education Centre

3.1. ANIMATION—AN ANALYTICAL OVERVIEW

3.1.1. Learning from Architectural Documentation

Mixing different cultural forms in architectural practice is not new. For example,

texts have been an integral part of architectural (construction) drawings for quick information delivery. This technique of assimilating different media in digital architectural analyses, however, needs to be revisited. No longer do architectural visualizations include only texts and static images. Moving and three-dimensional images and sound should become an integral part of architectural analysis as well.

3.1.2. Learning from the Movies—Narratives: Textual, Verbal and Visual
In the silent movie era, music and captions support the actions on screen. Although the actions could exist independently, without captions, they could be subjected to wider possible interpretations.

In today's cinemas, languages are often translated to draw closer different cultural backgrounds. With some limitations, such translation - through subtitles or dubbing—is often used to convey particular ideas and cultural symbolisms.

Architecture, being a form of visual communication, is inevitably dependent on visual narration/translation to explain. Other limitations do occur too in this form of narration. Visual narratives, in architectural visualizations, assist in 'materializing' the form, scale, colours and fabrications, spatial/environmental relationship, language, details and to varying degrees, the spatial experience of a building. The addition of textual and verbal narratives, however, is required to directly address aspects like the nature and background of the project, functions, design rationale, spatial descriptions, and highlight features that may not seem obvious in the visual narration.

(see Figure 2 from http://www.arch.adelaide.edu.au/~vkwee/caadria/main.swf)

Figure 1(a) Screenshot from animation : visual narrative

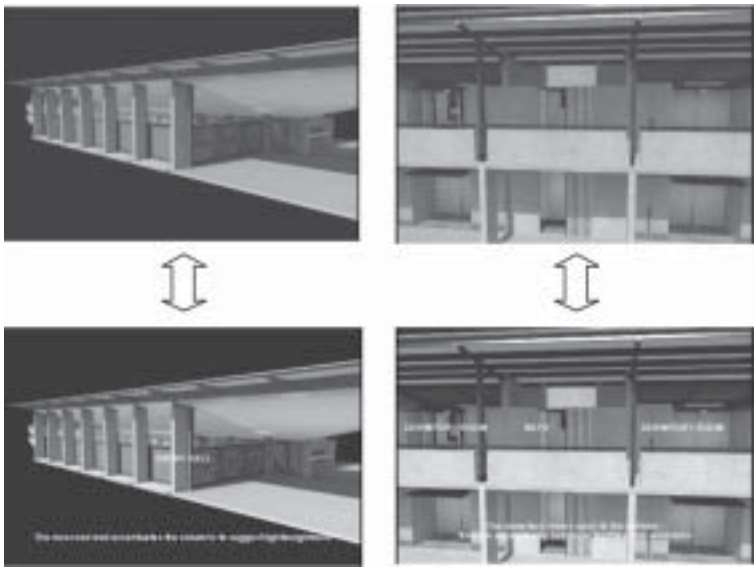

Figure 1(b) Screenshots from animation : visual +textual narrative

3.1.3. Software Technology Mixes

The creation of the above movie requires software/technology from:

Architectural applications:	1
2-D Graphic applications:	1
3-D Graphic applications:	1
Video Composite applications:	2
Others:	3
Total:	8

3.1.4. Considerations

In 'Experiencing Architecture', Rasmussen outlines issues of architecture that should be observed—solids/cavities and their effects, colour planes, scale and proportion, rhythm, textural effects, daylight effects and sound. (Rasmussen, 1959). Relying on digital architectural animation alone for the purpose of analysis, however, may not fully address all these issues as limitations do exist in any one type of representation technique; animations are not exempted.

Architectural animations are a linear form of presentation, framing views from a predetermined camera movement, speed and path—a more restrictive version of a theme-park ride which usually may not reflect an ordinary human experience. This could be seen as strength for the use in architectural analysis. Although it deviates from the exploration of spatial/architectural quality seen from any arbitrary human-scale point-of-view, it directs attention to the important attributes. On the other hand, some may argue that this carries the author's bias on the subject/s and only asserts his own self-centredness by creating an environment that "...becomes his medium for defining his role in it" (McLuhan, 1967). Considering this aspect and several others, animation may never be used solely for analysing architecture in its entirety.

Perhaps seen as adding to the existing authors' bias, the introduction of textual and verbal narratives appears to draw attention even more to a specific focus within the entire narration. The amount of information presented in this textual form is dictated by the timing of the preset, linear moving image. In this condition, information has to be pre-selected based on the authors' judgment and discretion.

Distractions may occur when textual/verbal information overrides the visual narrative. However, digital movies like the above could be replayed at random point and even paused for a more prolonged study. While this could possibly 'alter' the original experience to a certain extent by shifting a degree of control back to the viewer, any visual, textual/verbal information could also be recaptured.

3.2. ANALYSIS OF COMPONENTS AND THEIR RELATIONSHIP

3.2.1. Learning from Layering

The concept of layers has been utilized in many graphic software systems including CAD/CAM applications. In traditional practice, the layering technique is used by animators more than in the architectural field to see through an 'onion skin' paper to refer to their previous image in working on their next drawing.

Similarly, applying 'layering' to an object VR for architectural analysis purposes, shows the progressions of component make-up; this assists in understanding the relationship of components.

(see Figure 2 from http://www.arch.adelaide.edu.au/~vkwee/caadria/main.swf)

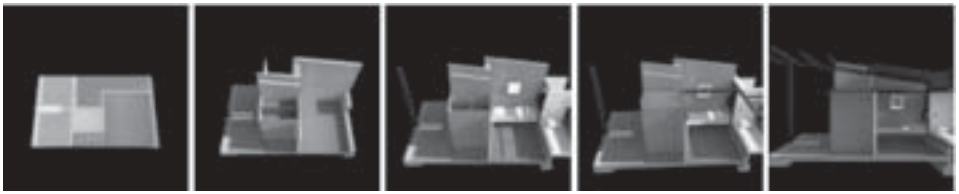

Figure 2. Screenshots of object VR layers showing construction progression.

3.2.2. Software Technology Mixes

To create the above object VR, the number of software/technology from:

Architectural applications:	1
2-D Graphic applications:	2
3-D Graphic applications:	1
Others:	1
Total:	5

3.2.3. Considerations

An object VR renders a digital experience of architecture in a different manner to that of a panoramic VR. It does not include the experience of 'being in the space', but provides a holistic view instead. It is this strength, coupled with its ability to manipulate views, which makes it suitable for studying component relationships. To effectively exploit its usability, level of legibility and focus need to be considered. In the above example, for instance, instead of displaying the entire building or block of the accommodation wing, a smaller section is extracted, based approximately on the architectural section drawings.

Adding textual narratives into this form of visualization helps to explain the components' roles/functions in the larger context of the design.

3.3. MORE MIXES OF CULTURAL DIMENSIONS

3.3.1. Learning from RAM Player

RAM Player in a 3D-graphic software, i.e. 3D Studio Max is often used to compare two different rendered images among others; this is a similar concept to the above layering concept, but it employs a sliding transition which gives an overlaying effect. It can be used for different purposes. While any images could be loaded for comparison, it is also possible to take the concept further to overlay two different forms of images - digitized and computer rendered pictures, for instance. Three-dimensional images can be 'overlaid' on the corresponding two-dimensional construction drawing for an enhanced reading of the images.

(see Figure 3 from http://www.arch.adelaide.edu.au/~vkwee/caadria/main.swf)

Figure. 3. A screenshot from 'overlay' of 3 dimensional computer-rendered image and a manually drafted architectural drawing.

3.3.2. Considerations

By juxtaposing and aligning the rendered image on top of the corresponding architectural line drawing, the spatial quality suggested by the line drawing can be well appreciated. Furthermore, two-dimensional elements in construction drawings

can be perceived in their third dimension, visually-enhanced with their material/ textural representations. Due to the large size of the actual document and the limitation of screen size, however, architectural annotations describing the components may not be legible.

3.3.3. Learning from the magnifying glass

Much like the magnifying glass, digital magnification creates an enlarged virtual image of another—only virtually. This proves useful in dealing with screen size limitation to display a large document. Magnification too has been extensively used in 3D games; in a 3D first-person 'shoot-em-up' game, for instance, two or more scene versions with different field-of views sharing a common central focus run concurrently, and much like layers, they are interchangeable depending on users' requests. Magnification, as opposed to zooming, retains the contextual relationship with the original image where the larger picture is still visible; zooming, however, replaces screen display to only the enlarged portion of the user's free choice; disorientation may often occur when zooming (in and out) are repeated beyond the user's ability to relate to the original picture.

In combining and overlaying architectural drawings and a rendered image on to computer screen, magnification assists in reading details as well as textual descriptions which would otherwise be too small to be legible. (see Figure 4 from http://www.arch.adelaide.edu.au/~vkwee/caadria/main.swf)

Figure 4. A screenshot from 'overlay' of 3 dimensional computer-rendered image and a manual-drafted architectural drawing with magnification.

3.3.4. Software Technology Mixes

In order to devise the above overlay effects and magnification, the number of software/technology from:

Architectural applications:	1
2-D Graphic & web authoring applications:	2
3-D Graphic applications:	1
Others:	1
Total:	5

3.3.5. Considerations

Legibility of details can be augmented through magnification. Planning for screen space allocation and deciding on a technique of magnification may prove to be challenging considering the restriction on screen display size.

More issues would arise if the drawing document is too large to be effectively placed on screen without panning capability.

4. Conclusion

There is a considerable opportunity to lessen the involvement of intermediary communication—texts in explaining architecture. The arbitrary nature of the relationship between the signifiers (words) and the signified (de Saussure et al., 1983) and thus also the accepted occurrences of polysemy in this type of representation do not justify the predominant use of texts as an accurate representation of certain objects (Friedman, 2000), especially of one as complex and multi-faceted as architecture. A framework to regulate the role of texts as support for architectural visualizations especially in the analysis of architectural works should be investigated further. This would foster more transparency and facilitate a clearer grasp and understanding of the final product.

Presently, the execution of a detailed architectural analysis in the digital platform can be further enhanced through the amalgamation and re-interpretation of technological strengths, concepts and techniques found in other fields. Without a reasonably in-depth knowledge of them, however, there are still difficulties to execute predominantly visual analyses to narrate certain aspects of architecture. However, to help us validate and define the current position and the possible future direction for architectural analyses, it seems imperative to learn from and understand the positions, strengths and features of visualization and representation techniques in other fields—traditional or otherwise.

The authors' research and outcomes hope to highlight and offer perspectives to address the above issues. It is aimed to help in refining and re-defining architectural information delivery with emphasis in visualizations for analysis purposes. To quote

Edward R. Tufte, “The only way to see it is to see it”. (Edward R. Tufte CLB Interview, 1997)

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