Chapter 1 | Introduction

1.1 | Background

The importance of precedent learning in design is well recognised and acknowledged by education researchers (for example, Oxman 2004; Bridges 2006; Pearce and Toy 1995). The proliferation and popularity of architectural monographs about existing buildings suggest a high demand for this mode of learning. In academic settings, learning from precedents is a well-understood tradition. Active learning through travel and onsite visits is also encouraged within the discipline.

Unlike most forms of creative products, architecture is not easily transportable for students and the general public to appreciate. The oddity of this characteristic cannot be more apparent than in the Victoria

and Albert Museum in London where architecture seems to be the only art object that is showcased exclusively in representations rather than the original objects. As clearly exhibited there and understood in the discipline, architectural information has been relayed in the media of texts, line drawings, Renaissance-architect-perfected perspectives, physical models, photographs. In the past two decades, computer/virtual reality (VR) models and animations have been introduced. Inarguably, every one of these media has its particular merits (or shortfalls) in facilitating the study of an architectural work.

In the absence of the masters who design it to explain, architecture relies heavily on secondary means to communicate its presence and message. These secondary means often become surrogates to impractical onsite visits. Such representations of built form have been accused of having a negative effect on our understanding of the subjects: 'They are static where it is dynamic, contained where it is open, two-dimensional where it is three-dimensional' (Venturi, Scott Brown, and Izenour 1977, p.15). Nevertheless, to many students, publications of architectural representations are not only serving as facilitators for the understanding of existing structures; they have become 'substitutes' for the objects they claim to explain. With the realisation of this crucial role of secondary resources or publications, more attention has to be paid to their quality and performance in delivering architectural information. We need to question: how should architectural information be treated in architectural publications or presentations?

The main preoccupations of recent research works in the digital representation of buildings have been the evaluation and uses of hardware (PDA, mobile technology, projectors, etc), virtual reality (VR) interactivities and photo-realistic renderings. These projects are significant, but they appear to particularly emphasise conduits of information which are less accessible or mainstream. Representations and visualisations of architectural information for the public at large and

especially for those within the academic circle deserve attention. According to McLuhan's assertion, the medium is the massage and one of the integral parts of the equation. More than this, however, what information and the manner in which it is to be presented command urgent attention as well. More focus has to be paid to the packaging of such information for an educational setting.

Through the facilitation of digital media, architectural information has become more fluid. Have we now reached the potential provided by the platform? What will be the future or immediate direction? What are the general perceptions of the information receivers or audience? How do they assess the current sources of architectural information? What limitations should one be aware of when designing a delivery system? What constitutes the basis for selection of an architectural subject for a digital recording and representation? These are some of the questions among many that must be addressed to forge towards clearer re-presentation of architectural information.

At the current media crossroad, the availability of traditional and digital contents is at its historical height and personal computers are widely accessible. It is an opportune time to reassess publications of architectural works in order to propose possible directions for the digital delivery of architectural information for educational purposes. While exciting state-of-the-art visualisation and information delivery systems are available, the most common vehicles though which digital contents are displayed today are still computer screens; it seems, this situation will continue for some time. Therefore, this thesis revisits and aims to propose a direction for the digital dissemination of architectural information of design precedents through these most-accessible 'flatland' vehicles.

1.2 | Hypothesis, Research Question and Aims

This research project is based on the hypothesis that more architectural information will be sourced digitally. While it foresees continued improvement in speed of access and delivery, this research project essentially attempts to answer the following research question:

- How could an architectural precedent be presented on a computer screen to exploit the advantages afforded by digital media?

In its approach to address the above research question, this thesis aims to:

- Shed light on relationships between current media and the construction of readers' understanding about architectural projects, in order to investigate the opportunities for more effective delivery methods.

- Propose considerations in gathering information about notable architecture, particularly for use in precedent studies.

- Highlight advantages in using a digital platform to relay visual aspects of architectural information and possible areas or directions that could be explored.

- Propose a possible model for digital architectural publications.

1.3 | Objectives and Scope

Considering the aims above, this thesis has three distinct but interlinked objectives:

- To collect feedback and perceptions about the performance of current architectural publications.

- To collect a substantial level of information about an existing architectural work from the available sources. The project chosen is *the Arthur and Yvonne Boyd Education Centre*, West Cambewarra in the state of New South Wales (NSW), Australia. More details for choice criteria are explained in Chapter 4.

- To explore several visualisation techniques which have yet to be adopted in digital architectural publications.

The broader objective that relies heavily on the outcomes is to propose a direction for digital presentations by means of an illustrative digital prototype.

This thesis does not include:

- Debates on the quality of renderings and other technical quality of digital visualisations and its cognitive effects; it may, however, touch on a few selected criticisms that have been raised on the issue.

- Reviews of CAD/CAM applications or graphic software, although much of the work relies on the technology for the production.

- Historical analysis of architectural [re]presentations. It highlights only the ones that are currently/regularly used in current publications.

- Architectural history/style overview, analysis or debate.

- Comparisons or contrasts between traditional and digital presentations of architectural precedents.

The research work is limited to the exploration of architectural information through computer screens. Independent surveys have shown that the use of computers has been rapidly increasing globally

(Pew-Research-Centre 2006; IBD 2004). With the huge commitment already made, it seems likely that computers will remain a popular as information conduits for some time to come.

In 1884, Edwin A. Abbott, wrote *Flatland: A Romance of Many Dimensions* (Abbott 1884) . It delves into worlds of varied dimensionality seen by a two-dimensional entity: a square. More than a century later, the possibility of two-dimensional flatland escapes are explored by Edward Tufte in his *Envisioning Information* (Tufte 1990) and *Visual Explanation* (Tufte 1997). With the proliferation of digital visualisations and representations that steer away from the needs for prints, we are now dealing more with the expansive possibilities offered by the digital flatland of the computer screens. The screen, in essence, is a fixed-size window that one looks through. Its view can be shifted in proximity and location of a "machine's space", as Baudrillard terms it (Baudrillard 2002, p.178). It is able to maneuver the perception of space and thus, figuratively speaking, could help one to escape from the 'flatland'.

The computer screen's strengths have been long recognised to surpass those of traditional media in many ways. Millet highlights the instantaneous display of information as one strength to capitalise upon (Millet et al. 1991). It is this very advantage that lends the device the ability to layer multiple similar images to contribute to the continuity of perception. Jan Janssens' study indicates that the experiences afforded by computer screen imagery is comparable to those of real-life (Janssens 1997). This establishes and recognises the power of visual media in invoking a sense of the real.

Without dwelling on the progression of computer screen technologies from *cathode ray tube* (CRT) to *liquid crystal display* (LCD) and perhaps stereo display (which may gain more popularity in the future), the basic limitations are essentially similar. They relate mainly to two important aspects: resolutions and screen area. Many established graphic software applications available in the market today have addressed the

image resolution and size limitations of the platform well. The issue of addressing these limitations will be expanded further in later chapters.

1.4 | Methodology

The methodology used in this research combines various strategies that are needed to investigate different components of the study. It comprises a literature review, surveys, data collection (including documents and interviews), analysis, exploration of visualisation techniques as well as developing and testing a case study prototype. This integrative approach is increasingly implemented in many research fields (Groat and Wang 2002, p. 361).

Firstly, in the absence of existing studies into the current performance of architectural publications, it is difficult to justify the research pursuit and address the needs of the audience for production of the prototype digital presentation about *The Arthur and Yvonne Boyd Education Centre*. The justification of the project is based on answering the question: Is there an opportunity to promote and improve architectural publications especially in the digital format based on audience perception of the current situation? If so, to which areas should attention be paid?

Secondly, in order that the digital prototype could be produced, detailed research seeking appropriate data and information about the building is needed. These data are further filtered and categorised based on their relevance for the inclusion in the prototype. The process of data collection necessitates immersion in and familiarity with the object of design. From this stance, informed assessment of the suitability of information can be made.

Thirdly, graphic and visualisation technologies and presentation techniques need to be researched for the potential of their use for the delivery of information specific to the case study. What possible suitable

applications or concepts could be adapted appropriate to the usage in the field?

When the above are completed and a prototype is produced, this prototype needs to be assessed by a group of initial users in a simulated setting of architectural learning.

Thus the research methodology is comprised of three main components that investigate:

- The strengths and weaknesses presented by current publications in delivering information about specific architectural works. This is approached through studying the current media performance in explaining and educating students and the wider public about particular notable buildings. An online survey is carried out in order to achieve this objective (Component I – Figure 3.1). Its outcome is used to inform the overall research project.

- A case study: *The Arthur and Yvonne Boyd Education Centre* by Australian architects Glenn Murcutt, Wendy Lewin and Reg Lark. (Component II – Figure 3.1) The process includes:

  - project selection criteria
  - a research into the project background
  - collection of onsite/offsite information
  - interviews with the relevant parties involved in the realisation of the building
  - user feedback

- Visual digital presentation techniques. (Component III – Figure 3.1) It entails an investigation of means for delivering architectural information specifically for educational purposes and assesses what the current technologies could facilitate and add to the dimensions necessary to address the requirements for this production of

educative material. A digital reconstruction of the building is used in most of this exploration process.

The methodologies of the above components are described separately in later chapters in this thesis. As noted, their combination is intended to lead to *the Arthur and Yvonne Boyd Education Centre* digital presentation. This illustrative prototype is an extension of the tradition of explaining iconic architecture that relies on printed monographs. However, while the proposed sample segment of the 'final' illustration does not insist on definite or final prescriptive techniques for the delivery of architectural information, it suggests an approach that could be further investigated and improved upon.

The process of designing an architectural presentation is similar to the conventional design process of analysis-synthesis-evaluation (Lawson 1980, p.28). This necessitates that the above components be carried out almost concurrently. As such, the proposal for the building visualisation has to undergo a myriad of transformations to include the new findings of the research components above. And like any design process it shall never be complete – i.e. any solution could be revisited, redesigned and re-evaluated all over again.

Chapter 3 of this thesis concentrates on Component I while Chapter 4 explains Component II and III in more details. The Illustrative prototype will be explained in Chapter 5. A discussion and evaluation of this illustrative prototype through a focus group feedback will be contained in Chapter 6.

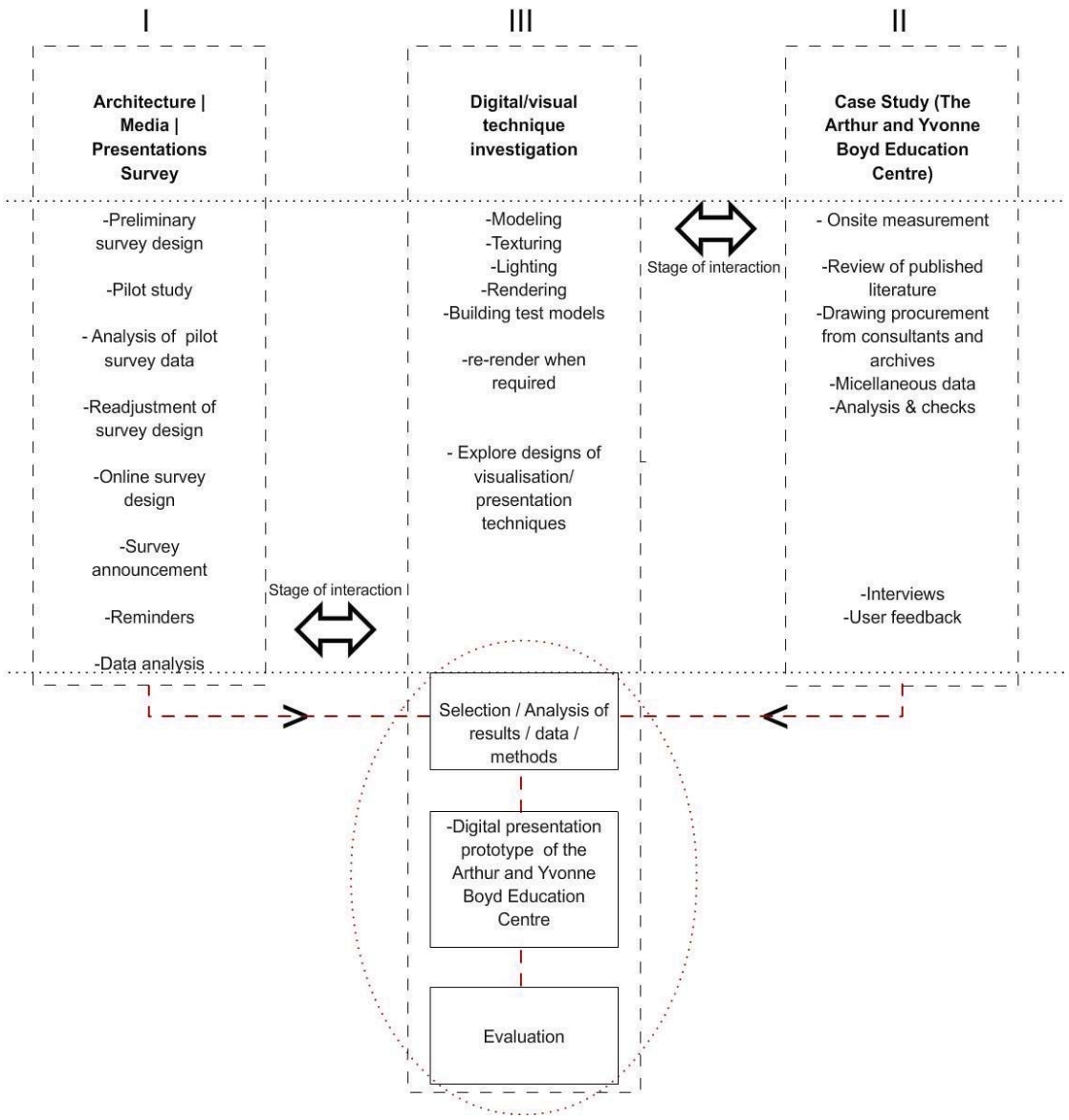


Figure 3.1 *An overview of methodology.*

1.5 | Definitions

A few key terms used specifically within this thesis must first be explained. How they are used in this text should be comprehended in the definitions set out below. The main justification for the way they are defined is primarily to set out the limits of the terms' implications.

On Media

As Poster notes, Baudrillard proposes that media construct the politics of the object (Poster 1995, p.18). This is perhaps aptly illustrated by McLuhan's playful metaphor that *the medium is the massage* (McLuhan and Fiore 1967). It denotes a relevant characteristic of media's general appearance which focuses on the role and influence of a medium in the delivery of content rather than the medium itself being the content. It deals with the degree of effectiveness of information delivery relying on the medium that carries the message – i.e. how well the medium 'massages' or presents the contents which subsequently affects (at a higher level which will not be dealt with in this thesis) our social behaviour. To some degree, this thesis does investigate this level of media 'massage' effectiveness, specifically in the delivery of architectural information to its audience. This is to derive and propose possible directions and serve as the basis for a digital information visualisation prototype for *The Arthur and Yvonne Boyd Education Centre*.

This thesis limits the definition of a medium specifically to texts, still/moving images or particular types of symbols which directly signify or present information. In some contexts, 'abstraction' may be used to emphasise the medium's substitutive quality. These media or abstractions are the predominant agents in architectural information delivery. They are widely used to portray thoughts and ideas, descriptions of the physical as well as the synthesised world. Higher in the hierarchy are the conduits or vehicles which are set apart from the term for clarity purposes. These include books, television, computer and screens, newspaper, magazine, etc.

The term 'multimedia' and its multiple synonyms shall be avioded for their use appears to have a loose connotation that would not explain precisely the meaning other than the use of more than one linked medium.

On Architectural Publication

'Architectural publication' in this thesis, as stipulated previously, is mainly concerned with the publications that attempt to explain the architecture of particular existing buildings. These include architectural monographs in prt or digital formats where the main thematic idea is to provide an insight or understanding into the design of the architecture. Therefore, unless stated otherwise, wherever used, the term denotes only such materials.

On Representation

'Representation' used in this thesis connotes the use of a medium in place of a cultural object. The representational form often does not provide an accurate depiction of the referent. The digital symbols, for example, – i.e. texts, images, etc – will never be able to represent the reality of architecture as they bear no likeness in its barest form to the actual objects. The Barcelona Pavilion on the same site as the original in Barcelona would be considered a 'reconstruction', a 'replica' or sometimes falling into the seemingly negative connotation of being a 'fake'. It is less frequently considered a 'representation' of the original pavilion. In most cases, architectural representations do not reflect the true site conditions of the building.

In an attempt to minimise misreading and avoid any debate of its true role and effectiveness, 'representation' throughout this thesis implies the representation of the information instead of the object which carries that information. The difference lies in the tolerance possibility of [mis]representation of the former. An image of a chair in a building, for instance, although it would likely not depict the true colours, textures, form or proportion associated with the real chair, is tolerable for the purpose. However, lacking similar physical attributes, that very same

image would have difficulties in being accepted as a replica of the referent.

On Presentation

Most projects have used the term 'presentation' [of information] in its general sense. This is a loose definition which could be viewed from angles of accessibility (in terms of an archival/retrieval system), showcasing or explicating data and analysis. Therefore, for the purpose of this thesis, the presentations of information representations are classified into three broad orders (in some cases, intermixing may be found):

- A common repository could be deemed as a presentation of information. This is frequently exercised in the traditional archiving system or electronic searchable database. This presentation method groups data/information only according to their broad general classifications often with keywords or indexes used in its retrieval system.

- A logical structure organisation that groups information according to particular rules of commonalities such as a catalogued data. An example of this is EDAT (Electronic Digital Assistance Tool) (Akin et al. 1996). Visual data indexing and retrieval systems are discussed in-depth and exemplified in (Koutamanis 2002; Koutamanis, Timmermans, and Vermeulen 1995). Systems of menu hyperlinks in the digital platform could also be considered to fall in this category. In most cases, information 'presentations' end here. This is understandable due to the often large amount of data.

- An organisation based on analogical/referential reasoning. It structures interest-based selection of information-filled media into a visual web of inter-connected components according to correspondence of information substance or concept. Visual

Thesaurus by Thinkmap, for example, provides the barest visual to connect text with similar meanings. Due to the understandable limitations of media and the form of delivery, this has been poorly attempted and overlooked in published monographs of architectural works (discussed in Chapter 2) or academic presentations or competition entries (e.g. Figure 1.1).

This thesis deals largely with the above third order of presentation; the delivery of architectural information to architecture students and professionals (including faculty) as well as architecture enthusiasts (to a lesser extent) becomes the central focus of this study.

NOTE:
This figure is included on page 14 of the print copy of the thesis held in the University of Adelaide Library.

Figure 1.1 *'An Architecture Assemblage' – Andrew Byrne, The University of Melbourne. (BHP Competition 2005).*

On Interactivity

The Webster's Dictionary defines 'interactivity' as: 'of, relating to, or being a two-way electronic communication system (as a telephone, cable television, or a computer) that involves a user's orders (as for information or merchandise) or responses (as to a poll)'. Its connotations are too general to be useful – for example, a mere shift or impression of input device that triggers a movement of cursor on the computer screen could suggest interactivity (this is further elaborated in Manovich 2001 and Pita 2005). The term is thus used sparingly in this thesis and will be defined in terms of responsiveness within the context of its use.

1.6 | Positioning Digital Architectural Representations

As far as virtual representations are concerned, Baudrillard argues that virtuality 'gives you everything, but at the same time, it deprives you of everything' (Baudrillard 2002, p.180). The deprivation, in this instance, may be linked to the absence of the physicality and tactility of the real objects, thus the absence of 'true' experience. This appears to be an argument that applies to any delivery mode where the referents are not included – whether a pictorial depiction is in digital or print format. The tactility of the paper of a book, for example, cannot be likened to the tactility of a brick that the text medium may describe. As such, we can safely conclude that although the text may provide the mental image of a brick, it is dependent on our unique past experience to give it meaning and materiality. It is the idea that virtuality could afford us 'everything' that is interesting and needs to be explored further since what it gives often does not necessarily equate to what we have received or could possibly receive.

While working on representations, it is hard to ignore Baudrillard's notion of *Simulacra and Simulation* (Baudrillard 1983) which exerts much influence on how media are perceived and their effect on social responses. How do we, in turn, position architectural representations of existing buildings within this schema, if at all?

Baudrillard argues that there are four orders of signification:

1st order: Signs are thought of as reflecting basic reality.
2nd order: Signs mask reality.
3rd order: Signs mask the absence of reality.
4th order: Signs become 'simulacra' - they have no relation to reality but are pure simulation.

If we consider a digital architectural information visualisation of an existing building as a sign, where and how does it sit in the above order? Such visualisation only takes reality as reference but does not contain properties that can be said to be applicable to the real. It does not reflect the scale, the materiality or tangibility of the referent. Therefore, it does not reflect 'basic reality', but mere coded visuals that refer to (not necessary reflect) the information of the real. It purports to furnish information pieces that may be lacking in the real, thus unmasking rather than hiding reality. It highlights or reiterates or even exaggerates information of the real object - information which sometimes may not be obvious or visible on site (but exists, nonetheless). For its ability in showing 'valid' information which the building is incapable of narrating, the digital media may become a facilitator or conduit of the non-tangible reality aspects.

Digital architectural representations would assume a totally different role and political construct in the absence of the real and/or interest in the real. Bearing this in mind, such representation would be unlikely to fall into the category of the 'hyper-real' since the interest in the existing reality and the availability of 'valid' information are the representation's underlying basis for its own existence.

One may argue that this perhaps holds little bearing on how we should place digital representations in Baudrillard's order of signification above. Nonetheless, it is important to understand the positioning of digital

architectural representations as a basis to comprehend their potential even if it is only through our imagination. Architectural representations may not be limited by the real but free to be explored based on an ideal [of representing architecture] to be best understood by an audience.

In contrast to Baudrillard's four orders of signification, Plato asserts that there are intrinsically two levels of 'imitations' – one that is the real object that represents an idea and the other an artist's impression of the object (Plato 360 B.C.E). Architectural representations could easily be perceived as 'imitations' of an [artisit's] ideas to describe buildings. By viewing it at this angle, it releases one from excessive limitations associated with the real. This strengthens and paves the way to unlimited explorations of representation as well as presentation possibilities.

Digital presentation of architectural information of an existing building, in reality, does not recreate content to fill the void left by the absence of the physical object. An experience through a representation of an existing building is certainly not a substitute for an onsite visit and thus architecture can never be replaced by any of its representations. 'Phenomenologically, body and perception are united, body is not primarily in the space but it is of it' (Merleau-Ponty 1962 as discussed in Stenros 1993, p.86). Thus, the spatial properties of an onsite experience cannot be likened to one in front of the computer screen. However, its perception, according to findings by Jan Janssens, corresponds well with the reality, and expectation or prediction of reality is heightened with more visual information provided (Janssens 1997, p.38). The likelihood for visual digital representations, no matter how immersive they are, to replace actual site experience still seems minimal. Similarly, it can also be said that the likelihood of them replacing other mode/s of representations – e.g. texts, physical models, etc - is intrinsically impossible. The uniqueness of the physicality of digital representations is non-existent. They rely on colours, hues, saturations, brightness and contrasts to set one digital representation apart from another.

Having said that, similar to other modes of presentation, architectural representations on a computer screen can also be a collection of extracted information about their referents while containing observations by the authors and explanations by the architect(s) of the buildings they depict. Thus they can have the potential to be dependable secondary sources of knowledge and serve to enrich one's eventual onsite visit as well. This assumption forms the basis of this study.

1.7 | Summary

Precedent study is an integral component of architectural education and relies heavily on secondary publications. With the increasing popularity of digital platforms, the presentation of information becomes an area of both opportunity and concern - more than just the provision of information, the delivery aspect, especially of visual information, also needs to be further explored.

It is imperative to understand that since architectural representations (i.e. representations of architectural information) in any media are independent of their referents, their delivery techniques are also detached from the object they present. Therefore, the delivery modes of architectural information are themselves a separate entity whose potential could and should be investigated within their own realm, unaffected by the architectural object that they are attempting to explain. This notion allows the freedom of play and re-modification of existing presentation techniques.

Furthermore, although the experiences of onsite visits will never be replaced by substitutes, during the process of learning or understanding an architectural work through them, these representations will become replacements and will have to assume the role of, but not necessarily be isomorphic of, the real structures. It is thus important to understand that digital visualisations through computer screens will not replace onsite

experiences nor, for that matter, will they be able to simulate the experiences afforded by other non-digital delivery methods.

Chapter 2 | Current Scenario

2.1 | Background

Computers have become an indispensable part of today's modern human daily operation (it has been so since more than a decade ago - see Mitchell 1995) to the extent that, now, as suggested in William Mitchell's *Me++* (Mitchell 2003), electronic gadgetries have become an extension of human body. Whether it is us who have unwittingly metamorphosed as part of their whole network operation is unclear. What is apparent, however, is that computers have become ubiquitous and will only continue to assert their presence in the future even more. The desire to 'internalise' biologically-alien technology is demonstrated by our constant endeavour to assimilate its operation in what we are or have become familiar with. In the use of media in architecture or built environment presentations, it is no different. Translations from one form of representation to another are also a common occurrence.

Awkwardness in integrating various media to explain a work of architecture is commonplace. In their studies of a particular urban design, Ishii et. al. propose the use of a large luminous table as a platform to add physical drawings and models onto digital schemas. It highlights an attempt to bridge the incompatibilities of various media forms by the use of a light table with projected site plan, etc., where proposed structures would be positioned physically within the projected digital world (Ishii et al. 2002). Although it targets only a small audience, the exercise exemplifies the popular struggle for a more seamless manner in which different media could be linked to understand a particular design proposal.

In *Visualising the Invisible*, Bermudez, et. al. attempt to materialise the non-visual experiences of architecture (Bermudez, Smith, and Striefel 2005). Although the resulting visual representations appear to be too abstract and consequently irreversible as an experience to anyone outside the process and perhaps unusable as an educational material, the graphics do carry certain emotive aspects. The resultant interpretations may vary widely for different individuals.

On the other extreme, architecture has also been re-represented symbolically to narrate certain aspects of its characteristics. Yi, literally taking Friedrich von Schlegel's famous metaphor that described architecture as 'frozen music', investigates the reinterpretation of architectural systems of proportion in the Gothic and Renaissance era as musical annotations (Yi 1991). This is an example where the visual language of architecture is transformed into a different communication standard – one that it is widely accepted only as a medium between artistic expression and harmonic sound instruments. Unlike texts, the sequence of notes does not rely heavily on invoking emotive responses and past experiences to 'understand' the visual interpretation/s, but it focuses on systems of proportional and/or rhythmical dimensions. Similar to textual descriptions, however, it would need numerous

refinements in order to appreciate the complete building. Furthermore, to reverse musical annotations into the objects they originally represent with precision may require skills and knowledge that seem beyond those possessed by mainstream audience. Like emotive or rational responses of texts or abstract pictures presented by Bermudez, these forms of expressions are difficult, although not utterly impossible, to translate into complex points or planes in Cartesian co-ordinates.

As hinted at by Paraizo, the possibility of visualisation techniques are limited only by the imagination and suitable use of digital 'hyperdocumentation'; these techniques are of course, discipline-specific (Paraizo 2004). In his digital visualisation of urban structure of Rio de Janeiro, Ripper Kós (Ripper Kós 2003) has adopted this hyperdocument approach of combining a selection of still pictures to deliver the information of the city. A part of the presentation includes a single view point urban development sequence to illustrate periodic changes. Given the nature and details of architectural information, however, the execution and choice of media would unquestionably be different if it were to narrate the information of a building that exists within that urban fabric.

Vesely argues that with increased technological facilitation, creativity is undermined (Vesely 2004, p.20). This argument may seem logical where user skills in and exposure to digital media and tools are minimal compared to traditional drawing techniques and instruments. Meanwhile, other works suggest that instant digital manipulations and transformations assist in the development of creativity (for example, Hanna and Barber 2006). Realistically, technology cannot conclusively be thought responsible for any positive or negative effect on creativity. Also it would be difficult to compare creative output by different instruments and media since the usage of different media and tools would render the situation too complex for fair scrutiny or comparison; there are varieties of factors to take into account. Besides, considering the relatively short developmental history of digitalisation, studies on the

effect of technology on creativity may still be too premature to be justly arguable. This also extends to the digital design and implementation of architectural publications. This thesis does not dwell on the creative aspects of such publications through various forms of media. Instead, it outlines the patterns of presentation techniques adopted and how they could appear to affect the understanding of the subject matter.

Printed monographs of iconic architectural works are relied upon as sources of information. This is because they provide descriptive texts of the subject narrated from the author's point of view and pictures or drawings as supplements for further studies. The understanding of the subject through the author's analysis and the provision for additional materials seem significant to facilitate deeper evaluation by the readers themselves. Such a pattern of presentation is widely found and appears to be an accepted norm in these publications. Whether they are effective, or reliable, is another question.

Before studying in depth the current scenarios of architectural publications, we need to understand various media commonly used and their effects on such publications.

2.2 | On Textual Representation

As the linguist, de Saussure, states, the nature of a word is that it is independent of the meaning it symbolises. Therefore, although 'tree' and 'arbre' may signify the same entity in different languages, each may also represent meaning other than that intended – for example, 'a family tree', although less common, could also simply mean a tree belonging or relating to a family. Such use of a single word with multiple meanings is due to the lack of regulatory standardisation within the language, and by virtue of the visually non-denotative nature of text, the same set of characters could lead to several interpretations and implications.

This relationship between the signifiers (words) and the signified (objects) (de Saussure et al. 1983) and thus also the accepted occurrences of polysemy (some are highlighted in a proceeding section – Critique 1) in this type of representation raises difficulties in the predominant use of textual language as an accurate representation of certain objects (Friedman 2000), especially one as complex and multi-faceted as architecture. Furthermore, detaching textual descriptions from the subject to which they refer increases ambiguity.

Suggestiveness or ambiguity may often be seen as a possible strength in the design process (Glanville 1995). It is also noted that the degree of imagination is often heightened by the text medium (Liu 2003). On the other hand, due to the high degree of ambiguity found in predominantly textual analysis and/or explanations, often messages are misconstrued. To heighten understanding, the exploitation of primarily visual representations cannot be ignored. This is not to claim the possibility of achieving an isomorphism with its original physical form through such use, but only an imperfect visual simulation that is still very much dependent on many factors for its representational adequacy.

"The reader of texts on architecture has to mentally fabricate a 'concrete' image of buildings being described, to enter an ideal but architectural 'world' (as quoted in Walter Benjamin 1988, p. 89). This is because the rhetoric used to described buildings is metaphorically and culturally coded and relies on canons of visuality which are historically and socially understood" (Wartofsky 1979 p.273). Bearing this in mind, the implementation of the medium has to be considered carefully and with better support from other media.

2.3 | On Visual 2D and 3D Architectural Representations

Curiously enough, architectural representations are rarely openly acknowledged as an entirely separate art form in themselves. It is this probably inherent yearning to be recognised as an art form that causes

some architectural representations to take on abstracted delineations, such as those graphics depicted below (Figure 2.1 and 2.2).

NOTE:
This figure is included on page 25 of the print copy of the thesis held in the University of Adelaide Library.

Figure 2.1 *A traditional exploded axonometric drawing which introduces over-scaled 'pop cultural' figures. (Luscombe and Peden 1992 p.79- by Ivan Rijavec Architect).*

NOTE:
This figure is included on page 25 of the print copy of the thesis held in the University of Adelaide Library.

Figure 2.2 *An unconventional exploded axonometric rendered and overlaid on a typical Australian landscape background. (Luscombe and Peden 1992 p.169 – by Norman Day Architect).*

While most architectural drawings and representations take on the authoritative requirements for an accurate depiction of the built forms, the above examples probably 'significantly explore the limits of these requirements' (Luscombe and Peden 1992, p.13). In these illustrations, open interpretations are not only required but perhaps desirable. On the other hand, educational materials are expected to be less abstract in form to relay more accurate information. It is probably understandable, therefore, that photographs are more frequently used in architectural publications.

Photographs have been accused by Simon Niedenthal to be 'architectural fiction' (Niedenthal 1993, p.111) to the extent that they are sometimes more 'architectural' than the building they are depicting. However, such recrimination may apply to other media. It seems that the 'poetics' of architecture may often be transformed into the 'poetics' of the medium that attempts to represent it.

Arguments against static or 2D images are certainly not confined to their presentation alone. Desley Olwyn Luscombe and Anne Peden also draw attention to the limitations of static images in relation to experiencing architecture. They wrote:

> Response and contact with [architectural] issues from movement through it, social and visual cultures which determine responses, temporality and personal structuring of experiential input: idea of space and mass; response through the movements of the eye over the surfaces; impact of the viewer of being 'ground-bound'; the perception of detail referenced by material, colour, light, shade and texture; the space's furnishings; the confusion of each respondent's life, his/her own mood, purpose and company. These experiences are impossible to picture through the static medium of drawing (Luscombe and Peden 1992, p.16).

David C Chang and Peter Szalapaj assert that two-dimensional graphics do not convey spatial arrangements as well as animations (Chang and Szalapaj 2002). A survey of architects has also shown that animations are believed to help them and their clients understand the projects better (Noble and Hsu 1999). Pita suggests that computer graphic representations have achieved what the traditional representations struggle with in truly conveying the important concept of architecture: space (Pita 2005).

Regardless of the above supporting arguments for architectural animations, this thesis does not subscribe to the notion that architectural animations nor any other one particular medium can solely be relied upon as the only source of information in achieving in-depth understanding of an architectural work. For example, Rasmussen outlines issues of architecture that should be observed: of solids/cavities and their effects, colour planes, scale and proportion, rhythm, textural effects, daylight effects and sound (Rasmussen 1964). Relying on digital architectural animation alone will not fully address all these factors as limitations do exist in this type of representation technique. No other single medium is exempted.

Furthermore, the execution of architectural animations has yet to mature. We need to look beyond the architectural industry to learn techniques of animation/presentation (Chang and Szalapaj 2002). Techniques from the movie industry, for example, should be investigated further. Few have studied the adaptation of cinematographic techniques and narratives into architectural animations (Navarro et al. 2006; Temkin 2003). There is always a concern about such approaches; although interesting, they may tend to falsely assign a hierarchical significance that positions the narrative content/entertainment value over the understanding of the subject matter. It appears that as much as animations could be produced in a much more informative manner, currently they have not reached their fullest potential as an educational device.

Despite findings by Tversky et. al. (Tversky 2001) which claim that general animations are not as effective in facilitating comprehension, learning, memory and inference as static graphics are, it seems plausible that, as a component of architectural education materials, they will form a significant part of the visual communication media. The studies and arguments outlined above that refute Tversky's findings in the area of architectural learning are difficult to ignore, especially given that Tversky's studies are not discipline-specific. The ability to represent and narrate the continuity of space in animation needs to be acknowledged. The nature of static drawings opens this type of medium up to the vulnerability of misrepresentation of spatial properties, and this vulnerability has been exploited in spatially ambiguous drawings, including many of Escher's. Architecture needs more than a single-viewpoint rendition to understand its overall formal composition. Therefore, moving images are normally preferred over a single or series of non-related or difficult-to-relate static photographs.

Architectural animations are largely 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 does not reflect ordinary human experiences of space. However, this could be seen as a strength for use in architectural studies since it highlights the 'important' attributes. Due to this, it deviates from the exploratory freedom of spatial/architectural quality seen from any arbitrary human-scale point-of-view. Considering only this aspect, animations' reliability in portraying architecture the way a user with more freedom of movement would experience it may be questionable.

Perhaps seen as adding to the existing bias, the introduction of textual and verbal narratives to an architectural animation may appear to draw attention to specific points of interest within the entire sequence. 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 author's judgment and discretion. Furthermore, distractions may occur when textual/verbal information overrides the visual narrative. However, digital movies could be replayed at random points 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.

Criteria used in assessing the quality of architectural animations have yet to be established. Attention has often been focused on technical aspects of the visual medium rather than the architectural narrative and content. In the CG Architects' *2006 Architectural 3D Award Competition*, nominees for the animation awards exhibited a marked tendency to be freed from the usual encumbrances associated with architectural visualisations. They are injected with supporting details, components and emotive expressions by the creators while still maintaining, with success, the understandable expectation to sell buildings as products or simulations of a picture-perfect work/life environment or style. One of the nominated works seems dictated by the apparent narrative of a feature film. Had the architectural elements been done not as a support to the movie, they could likely have taken a different artistic narrative twist of their own. Inexplicably, artistic expression and narrativity are not heavily emphasised in the selection criteria for the awards - criteria with propensity to focus more on technical and skill aspects: 'View Composition, Modeling, Lighting, Texturing, Creativity, Technical difficulty, Originality, Final Editing, Post Production and Unity' (CG-Architects 2006). These criteria are similar to Ahmad Rafi Mohamed Eshaq's choice of elements for 'successful' animations which include: Storyboarding, Using available Visual Material, Establishing site context, Designing the cinematic depth, Establishing Scale and Proportion, Architectural detailing, Lighting, Visual Editing, Sound Editing (Ahmad Rafi 1998). Artistic expressions have not been duly recognised.

The Planet Architecture series on Zaha Hadid's works (Hadid 2003) described in the following section serves as another example. With its sleek interfaces and seemingly complete set of information, the presentations and delivery techniques particularly in the animations do not carry a strong effort to elevate an audience to an emotive level so clearly sought in Hadid's architectural masterpieces. Can they possibly do so, while also delivering information essential to an understanding of the architectural design? Judging from the nominees of the animation awards above and various still architectural illustrations where pronounced artistic expressions have also frequently been introduced, this may be possible.

Serrato-Combe suggests that it is time architectural animations 'come to terms with more mature attitudes and approaches' (Serrato-Combe 2004, p.257). He elaborates valid underlying reasons that at present, animations should be looked at more closely in the representation of architectural subjects. These reasons include:

- the inability of current technology to provide a convincing real-time virtual reality experience.

- the faster production of animation clips on today's machine.

- the unsurpassed overall qualities of architectural animation that can be produced.

The time-consuming nature of the rendering process does not facilitate convincingly rendered realtime VR that requires a high frame rate to be convincing (Champion 2005). Chalmers, et. al. propose selective rendering (Chalmers, Debattista, and dos Santos 2006) to reduce this problem. This technique relies on executing rendering processes only on selected portions of which viewers focus their attention. Understandably, it does raise different sets of issues - such as how should the author determine and ascertain a viewer's attention - and may not be entirely

practical in the area of architectural visualisations where there is usually no story/task-driven narrative to which to attract the attention of viewers.

In line with the above, the concern associated with virtual reality is still the difficulty in navigating through a virtual reality model (Ingram and Benford 1995; Champion 2005), particularly the problem of positioning within the virtual space and fixing the audience's attention to a particular information or content. One study proposes to take advantage of a virtual environment/character/event which has already captured the users' attention to highlight other relevant information (Steiner and Tomkins 2004). This, however, does not guarantee that the audience will focus on the important elements in the scene. Architectural animations, unlike story-driven animations, serve to narrate the significance of the overall structure and spatial volumes, and the experience through them should itself be the focal event. It is therefore unlikely to predict what object or feature of a particular space would attract more attention since the experience encompasses the holistic relationship between elements and spaces.

Therefore, it is clearly understood that pre-rendered animations have advantages over virtual reality for educational purposes at this time primarily because of:

- the need for focused information dissemination to facilitate an organised mode of understanding the subject matter, and

- the manipulability and usability of pre-rendered movies in multiple computer platforms, hence facilitating wider accessibility.

More than the externalisation of one's artistic thoughts, an educative animation requires executions that contain interpretations or understanding of the architectural design as well. This could translate into camera movements that highlight the architectural features or ones that complement the design language, for example. The technical

aspects observed by Serrato-Combe are significant points, but the execution of architectural animation beyond technical limitation or freedom would assist in augmenting architectural visualisation further to the level of maturity sought. In order to further leverage the quality of 3D animations, accurate information is required to allow the targeted audience to evaluate the subject themselves without having to solely rely on the author's point of view.

2.4 | Publications of Architectural Works

Presently, architectural monographs (of Alvar Aalto, Frank Loyd Wright, etc) mostly appear to be author-driven. They are often seemingly written with unrealistic expectations that readers not only should have prior knowledge of the subject matters but also a specialist disciplinary background in order to fully understand the author's message. In the case of classroom/design studio teaching, Donald A. Schön states, 'Some studio masters feel a need to protect their special artistry. Fearing that students may misunderstand, misuse, or misappropriate it, these instructors tend, sometimes unconsciously, under the guise of teaching, to withhold what they know…. Under the guise of learning, [students] actually protect themselves against learning anything new' (Schön 1987, p.119). It is not difficult to see the parallel between such classroom mentoring and the current situation related to architectural publications. The authors of architectural publications often appear to protect their 'special' knowledge by shifting the responsibility of contents to audience mis-/interpretations.

Thus far, there has not been any assessment done on the effectiveness of this long-established source of architectural information. The academic circle does not seem to recognise what their presence means, the impact of their contributions and how their form might be improved. Consider for example, *Educating Architects* (Pearce and Toy 1995) and *Changing Architectural Education*, two compilations of articles with rich ideas of how architectural design education should be and has been

carried out. These compilations appear to shy away from mentioning architectural publications as one of the sources of knowledge even though the significance of precedent-based learning is acknowledged in a few instances. This seemingly innocent oversight is also echoed by Lindsay Johnston who emphasises much discussion on the role of classroom teachings and tutorials feeding into design studio teaching (Johnston 1995) which probably focuses too heavily on Schön's approval for studio-based approach in design teaching. It is little wonder that with much power 'bestowed' to the design teaching profession, assessment is only done for such 'responsible' party to the extent that much negative criticisms have been placed mostly on this single source when weaknesses in the profession are identified. Normally, under scrutiny are architectural academia and also under attack as highlighted in *Revisiting the Discipline of Architecture* (Fisher 2001) are the architectural profession for not partaking enough in the education sector. Meanwhile, architectural publications escape 'un-credited'.

The following sub-sections examine closely some publications in which iconic architectural works are currently being presented and explained. This is to identify improvement opportunities and understand why more stringent assessments are long overdue.

Critiques - 1

The Global Architecture monographs series of world-renowned architecture is a typical example of a common communication approach. How this publication series imparts comprehension to its readers is an important issue that we should consider here.

In its 14th volume, for instance, relatively detailed textual explanations about the roof and construction methods of Mies' *New National Gallery* in Berlin are presented without clear, definitive reference to the visual supporting material. These visual supports are included in later segments of the book (Mies van der Rohe, Futagawa, and Glaeser

1972, pp.2-7). By this segmentation, the texts appear to be detached from the visual elements that could further be seen to describe the building in totally different aspects.

This pattern of explaining a building with clearly demarcated sections of texts, photographs and drawings, is repeated in other monographs of this series. Furthermore, particularly in the *Crown Hall/National Gallery* edition, with the exception of titles of drawings, the plans, sections, elevations are devoid of any kind of textual explanation. While these visuals can be appreciated in their abstract form, they do not appear to be as informative and substantiated with adequate information as they should be as educational materials.

Overall, although it provides much freedom for readers to study in detail, this lack of information link to the visuals could also easily lead to misinterpretation and misunderstanding of the subject.

> "….Independent of the rigid frames, the floor structure consists of a reinforced concrete slab resting on a 20 by 30 foot … grid of concrete columns. This separate system, which receive all the forces that act on the main floor has been criticised as inconsistent with the building's exterior appearance, which gives the impression that the main floor, as well as the roof, is suspended from the rigid frames. Nevertheless, one can interpret the internal floor structure as a rudimentary podium that permitted Mies to elevate, and thus emphasize, the main level. In addition, it enabled him to accentuate the entrances, the main access receiving a travertine-clad platform and two sets of steps" (Mies van der Rohe, Futagawa, and Glaeser 1972, p.3).

With texts like the above excerpt coupled with the Japanese translations, readers are left to explore what those components are and their locations in its 38 pages of photographs and drawings. It seems unlikely

that a reader without sound architectural background or prior knowledge of the building would be able to relate the elements in the texts with their visual counterparts to effectively share the author's impressions.

Other issues that need to be considered include cultural and disciplinary differences which would affect understanding. Most architectural monographs and writings appear to have targeted a highly specialised group who would be able to grasp the jargon used in the discipline without direct visual reference. There is no clear reason why this should be the case since they are meant primarily to educate readers rather than to assert the author's comprehension about the subject matter.

As another example, the following is an extract from a largely textual publication on Glenn Murcutt's works describing *The Arthur and Yvonne Boyd Education Centre*:

> "The building's interstices have been conceived as carefully as its volumes, as has the interface between the building and its environment. The dormitory range envelope 'feathers' increasingly towards its outer limits, thanks to the tapering down of the structural frames, the slenderness of the corrugated iron roof and the projection of fin-like sun-breakers…." (Fromonot 2003, p.286).

This text is accompanied by two photographs of the building on the same page as visual references (Figure 2.3). If only there were some ways to directly link the two media, a new reader may be able to comprehend the author's intention. As it is, for someone who has prior knowledge of the building and 'grasp' the essence of the text, the visual supports are clearly inadequate.

NOTE:
This figure is included on page 36 of the print copy of the thesis held in the University of Adelaide Library.

Figure2.3a *Pictures depicted on the same page as the textual explanations of the building. (Fromonot 2003, p.286).*

To illustrate the similar communication failure of depicting the same building, the Phaidon Atlas of Contemporary World Architecture includes four photographs - all of which are external views – hardly legible section and plan and a sketch by the architects showing the framing of views seen from the entrance portico. The text seeks to explain the composition of the building. An extract of the Atlas reports:

> "….The communal gathering spaces – hall, dining area and verandah – are grand, bold gestures united under a soaring roof plane. The smaller-scale dormitory areas that extend southward along the ridge are pod-like units articulated by

concrete blades that screen the sun to the east and west, focusing the dormitories' outlook on to the river below…." (Phaidon-Press 2004, p.39).

NOTE:
This figure is included on page 37 of the print copy of the thesis held in the University of Adelaide Library.

Figure2.3a *Extracted page from Phaidon Atlas (Phaidon-Press 2004, p. 39)*

Scott Johnson stipulates that 'both internal (mental) and external (physical or digital) representation are ….deeply linked to learning, the ability to use existing knowledge….' (Johnson 1997, pp.7-8). When a publication leaves a considerable gap to be filled by the audience, borrowing McLuhan's term, it turns the publication into a 'cold medium' (McLuhan 1964). In architectural publications for educational purposes, it is imperative that messages are clear and explicit. These 'messages' are not the outcomes of isolated media used, but are also the results of their interaction - quality of which affects the message clarity.

Findings by W. Howard Levie and Richard Lentz confirm the usefulness of graphics when used with texts in a complementary way (Levie and Lentz 1982). The above examples illustrate the lack of such complementary relationship between the two media, leaving the polysemous signifiers (highlighted in the above two excerpts in yellow and green) to be open to interpretations in varying ways related to the reader's cultural conditioning. These are not isolated cases and are found today in most current architectural publications of notable buildings.

Critiques - 2

Apart from the printed versions of architectural publications, there have been a few digital CD-ROM publications of architectural works produced as well. This section examines such works which have been published in this mode.

1. Alvar Aalto houses 2.0 - paradises for ordinary people.
Media used: Digital Texts, Photographs, Drawings/sketches.

The clean execution of Aalto's architecture is echoed in the layout of the screen. Graphically, the visual layout is simple yet appealingly conforming to the subjects it portrays. What each of the drawings represents is, however, too vague for viewers without prior knowledge to

comprehend. Adapting the look of an open book, the initial presentation on the computer screen is divided vertically in half with each segment presenting separate projects of Aalto's. These images are hyperlinked to larger graphics without additional substantial content or facilitation for in-depth investigations.

The main merits in its information presentation lie in the freedom and speed it provides for the audience to explore the materials on their own. It outlines a brief background of each project, serving as an introductory overview of Aalto's works. For the materials to be useful in precedent-based learning, however, they would need to provide much more pertinent detailed, legible information and maintain the facility for further explorations.

Figure 2.4 *Screenshots of digital presentation of Aalto's work (Aalto et al. 2001).*

2. Zaha Hadid Works. Physical Description.
Media used: Digital Texts, Photographs, Video interviews, Drawings/sketches/painting, Quicktime VR, Animations.

Information which seems lacking in Alvar Aalto houses 2.0 has been addressed to an extent in the CD-ROM of Zaha Hadid Works. Here, the substantial collection of information pertaining to one single project is highly commendable. The availability of various media would indeed better facilitate comprehension of the project. In the Contemporary Arts Centre project shown in the figures below, it particularly addresses the general background of the work well by including interviews of the designer and the project architect. Clearly, there is still a further opportunity to link visuals and provide a better platform for the study of this building since the media as they are presented now appear just as fragmented, serving only as a collection of well-arranged data.

Figure 2.5 shows screenshots of the CD-ROM section explaining the Contemporary Arts Centre. It seems apparent that any of the pages could have been an extraction from a print media. What sets it apart is the hyperlink feature and the inclusion of audio as well as video contents.

NOTE:
This figure is included on page 41 of the print copy of the thesis held in the University of Adelaide Library.

NOTE:
This figure is included on page 42 of the print copy of the thesis held in the University of Adelaide Library.

Figure 2.5 *Screenshots of digital presentation of Hadid's work (Hadid 2003).*

The compilations of Alvar Aalto (Aalto et al. 2001) and Zaha Hadid's (Hadid 2003) works are typical examples of electronic archival. By compartmentalising media, giving them little freedom to interact, they have taken a similar approach and structure of presentation to comparable works in prints. Again, problems with texts and visual components clearly exist and are repeated in these digital architectural publications.

3. ADMIRE.

Media used: Digital Texts, Photographs, Drawings/sketches/painting, 3D Models.

ADMIRE developed by Yoshitaka Mishima and Peter John Szalapaj is a project that analyses architectural works using multi-media that is aimed for architectural education purposes(Mishima and Szalapaj 2001). The analysis deals with circulation path and formal analysis to assist students to develop their own design schemes (Figure 2.6). Much like the CD-ROM's of Aalto and Hadid's works, the level of interactivity in *ADMIRE* seems limited to transporting users from one abstraction to another via hyperlinks. Closer integration of various media and information types still needs to be explored. As Bige Tunçer and Rudi Stouffs note, '… such systems lack the possibility to distinguish individual components within the abstractions and to relate these within and between abstractions' (Tunçer and Stouffs 2000, p.1). They instead propose a system of networked information. Their proposal, however, is only for two-dimensional images and textual information. As noted, there are more investigations to be done about handling graphical models. Studying this proposed system, it has the tendency to over-simplify architectural analysis, to, again, formal, tangible aspects, reducing information to a record in a database of elements and grouping them according to some common attributes, while sometimes forcing a categorisation of elements for the sake of the organisational structure and ease of retrieval, Again, this system falls in our second order of

presentation. There are some aspects of architectural analysis and thoughts that do not fall into as obvious categories as shapes and forms, involving a more complex overall relationship.

NOTE:
This figure is included on page 44 of the print copy of the thesis held in the University of Adelaide Library.

Figure 2.6 An e*xtract from (Mishima 1999, p.206) showing screenshots of ADMIRE explaining Villa Savoye.*

Critiques - 3

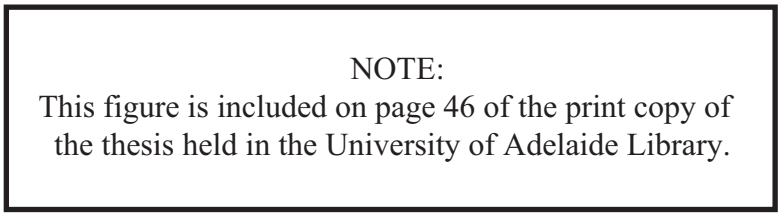
In 1988, Geoffrey Baker had incorporated digital animations in his video documentary of Richard Meier's *The Atheneum* (1972) (Baker 1988). Despite the successful, effective execution of video, digital model and verbal narratives, as also concurred in (Brooks 1988), this communication technique did not find its way into popular mainstream educational materials. The mono-directional, time-restricted, linear presentation in a video format like this restricts viewers from exploring the material in the way that printed materials would allow. It leaves little room for audience to assess the subject by themselves and construct their own opinions and knowledge about any particular aspect of the building. In terms of the nature of content, it provides an in-depth

interpretive analysis of the building – something that is lacking in Aalto or Hadid's CD-ROM's. But the authoritative manner that the medium and content seem to exude conveys a sense of finality. Thus, although compelling as instructional material, in this aspect, it is limited as an educational tool.

In 2005, Uddin used his student's work on the same subject where it concentrated on the computer graphics and animation aspect to facilitate an analytical platform afforded by the electronic media (Uddin 2005). The paper outlines the process and considerations for the production of the material. Despite the promising contention that the digital environment can create 'a new generation' of visualisation for architectural analysis (Uddin 2001), the opportunities of the media here, appeared to have been overlooked. This results in seemingly another replication of the approach of Geoffrey Baker's video documentary – in digital format.

Critiques - 4

The Internet is fast becoming a relied-upon architectural information source as it is for other kinds of information as well. *Great Buildings Online*, for instance, holds a large collection of ready-access pictorial and textual materials, with 3D computer models furnished at times. They are popular with students seeking supplementary materials in their case or precedent studies. It proudly claims to be an academic resource as suggested by the obvious symbolism of a mortar board depicted on the web pages. There are many other websites currently dedicated to the dissemination of information on architectural works. None has yet surpassed *Great Buildings Online* in terms of collection of works and number of referrals from other sites as well as contributions to the contents. Yet the pattern of fragmented media that fail to cohesively explain the subjects is also repeated in this digital form. They inherit the same problems of their printed cousins (Figure 2.7).


NOTE:
This figure is included on page 46 of the print copy of
the thesis held in the University of Adelaide Library.

NOTE:
This figure is included on page 47 of the print copy of the thesis held in the University of Adelaide Library.

Figure 2.7 *Screenshots of 'Great Building Online' on Mies van de Rohe's New National Gallery, Berlin. (Great-Buildings-Online which essentially depicts a similar structure to a book's.*

There are obvious merits to this digital replica in the Internet medium – mainly to readily transition readers from the already familiar print formats. Many internet sites, including *Great Building Online*, also take advantage of the ability to facilitate multiple-source contributions on a single subject, a concept which has been successfully deployed in Wikipedia and online forums. Content selection is then performed by both the content moderator, and the readers themselves. Meritorious as

the concept of dispersing knowledge to reduce author bias may seem, the mere act of selection of materials may be easily construed as a preferential selection of materials by the moderator therefore introducing a subtle, yet similar bias. This proves, in essence, bias is inevitable.

Consider Eisenstein's cinematography masterpiece of its time as an example. His montage technique in *Battleship Potemkin* (1925) is an attempt to create an illusion of multi view-points of a same scene. The resulting movie is carefully framed, its beautifully choreographed scenes stored on the celluloid and later cut and re-assembled into a montage. While Eisenstein might have intended his movies to flow with a Marxist dialectic undertone, the result was questionable as an unbiased example of narration. However dialectical his films may be interpreted to be through Eisenstein's adeptness in montage, they comprise selected, incomplete (and impossible to complete) thesis and anti-thesis which, in totality, can only be considered as the viewpoint of a single individual equipped with many cameras.

In his proposal for an extensible historical information presentation system to cater to 'evolving commentary of arguments…rather than conclusive documents' (Dave 2005, p.2), Bharat Dave also highlights that the availability of technologies to capture and generate data have surpassed those which allow for a system that accommodates myriad viewpoints and opinions on a single building. Within the study of historical architecture interpretive commentaries are common. The success of systems such as Wikipedia as mentioned above has proven it workable.

A degree of prejudice would still exist in any form of narrative. All forms of media contribute to a degree of biases (Rattenbury 2002). As much as we would like to think that we could escape into a neutral world of live data and hyper sensory experiences that could easily be afforded by the computer, as seemingly recommended but failed to be effectively illustrated by Glanville (Glanville 1995), it is practically impossible. Bias

is inescapable and is influenced not only by the content and its execution but also the medium in which it is presented. Introducing multi-viewpoints does not necessarily reduce prejudicial synthesis; it only introduces multiple biases. Logically, multiple viewpoints may introduce varied perceptions and thus may markedly influence the selection of information and learning processes of individuals from various backgrounds in different manners. Research has already affirmed that architects and lay people do have different responses to architectural representations (Bassanino and Brown 1999).

2.5 | Presentations - Standards or Guidelines

As can be deduced in the preceding sections, there is no established standard in the presentation of architectural information in today's publications in terms of content depth or techniques. Despite being fashioned with a degree of graphic sophistication, most of the publications fall in the second order of information presentation which is basically and merely an organised, compartmentalised collection of information. Anything that is consistent and standard within these publications seems to be fragmented pieces of information that require some effort to 'construct' the larger scheme - often, with many of the jigsaw pieces missing.

Scott Johnson highlights that "choice of representations can affect limited cognitive resources like attention and short-term memory by forcing a person to try to utilise poorly organised information or perform 'translations' from one representation to another" (Johnson 1997, p.8). Furthermore, for an external representation to be effective and valuable, 'it must avoid making users translate concepts from their internal representations into the terms of the external representation' (Ibid, p.9). Judging by his criteria alone, most architectural publications today would fail; often, the external representations presented are unlikely to readily concur with the internal representations conceptualised by the audience

reading based on the publications' textual content. This is plausibly due to the unsuitability of media and presentation techniques used.

The documentation of architecture for construction has a long history of commonly-accepted presentation standards, and they are readily legible to trained individuals. The fundamental and almost universal requirements that have continued over time include the use of two-dimensional elevations, plans, sections and details to relay crucial information for the building construction. On the other hand, for descriptions and explanations of already built works, popularised by architectural publications, in which often a visual third dimension is introduced, there have not been such a broadly understood set of standards. There have been common occurrences of photographs, multi-view perspectives/sectional perspectives, isometric/axonometric views, textured or coloured plans, elevations or sections added to texts. But both the extent of media use and the organisation of materials differ from one published work to another.

Digital architectural presentations and publications explaining architectural works are currently in a similar stage of non-standardisation. We need to improve the delivery methods to suit the larger audience instead of training individuals to read the presentations or publications. Most digital examples re-adapt the already non-standard traditional printed mode of delivery (evidenced by the illustrations in the critiques above). Where the product is not intended for in-depth public education or detailed assessment this method may be tolerable. However, the techniques used in traditional publishing should not be merely digitally replicated if we were to seek improved delivery techniques and thus understanding of the subject matter.

When aiming for a richer content to explain an architectural subject, it is imperative that content authors are equipped with a degree of comprehension and conscious response to the architecture and architectural intentions to be presented. Apart from relaying crucial

available information, understanding the design principles, for example, becomes an integral part of the process to paint a particular corresponding narrative. This will in turn affect the choice of media, tools and implementation that would affect the final work. Translating and/or interpreting the grammar of an architectural work, carrying it through in the execution and details of the digital animation may assist an audience in gaining a better understanding of the subject, particularly by instilling the 'feel' and the design intent through the narrative and expression of the authors.

The process of gaining thorough understanding to present an architectural subject involves more than merely collecting relevant information. Particularly in the case of an existing building, for instance, research needs to be carried out which may ideally entail site visits and studies. Architectural information is peculiar to each building. In order to explicate the essences of architectural works (i.e. the vocabularies, designer's intents, etc), in all fairness, their presentations cannot be generically produced and uniformly adapted. What one technique and approach could successfully achieve in explaining one building cannot exactly be re-applied to another building with the same expected results. Forms, scales, circulation paths, lighting assignments, designer's intents, other information (and types) to be delivered differ from one building to another. As such, executions are also open to be explored to not only address the practical issues but also to express the intentions of the architect and those of the author/s in order to strengthen the overall architectural narratives.

Unlike other categories of architectural visualisations, educational architectural visualisations need to include a minimum set of expectations that relate to specific building factors. These would depend on the target audience and would require the assessment by that particular group/s. It is difficult to say if digital materials featuring particular architectural works should be restricted by 'standards'. There appears to be two possible sides to the argument that seemingly create

a false dichotomy. For a 'standard' to be workable, it would only have to serve as a guide. Since the objectives are usually fundamentally the same in the creation of educative visualisations – primarily to facilitate deeper understanding – the formation of these guidelines is thus plausible.

In cases where architectural design knowledge is to be communicated as a record of and educational resource for heritage or existing notable work, there is value in establishing a yet-to-be-defined fundamental set of visualisation/delivery guidelines which helps control the quality of presented materials. Some of considerations to establish these guidelines may include:

- *Details of Information.* Richard Beacham et.al., suggest that there is a need for guidelines for visualisations in order that they are 'intellectually rigorous and robust as any other research methods' (Beacham, Denard, and Niccoucci 2006, p.263). The credibility and validity of digital reconstructions have often been challenged or questioned. This is especially true in the visualisations of lost historical and cultural heritage subjects where secondary sources of information are much relied upon. In existing architectural works, there may still be primary information sources or evidences which could be collected and presented. Therefore richer and more accurate information can be presented.

- *Cohesiveness of information.* Apart from content quality, in order to elevate architectural visual representations' educational value, there needs to be considerations for legibility of materials which often are attributed to linkages of information. A closer interplay between each medium with other media would be required to further explain and to minimise misinterpretation by the audience. This interplay assists in augmenting the explicitness of the information representation. This need has been highlighted by Gianfranco Carrara et.al. (Carrara, E., and G. 1992) even though their reduction

of information to particular abstractions seems ineffective, as noted by Bimal Balakhrisnan, et. al. (Balakrishnan et al. 2006).

In Zaha Hadid Works (The Contemporary Arts Centre) which was mentioned previously, for instance, a computer animation has been executed effectively to inform the audience about the building massing and its relation to the street. However, the lack of linked information that describes the textures, materials and lighting, for example, hinders the audience's understand of the broader nature of the built structure, much less the movement through the environment. The relationship between this animation, the photograph and drawings within the visual 'archive' appears to be weak, thus they do not appear to serve as well as they could have performed.

- *Accessibility of information.* Retrieval of information or viewing method including the platform on which the information is presented should be taken into account. This would entail considerations for the availability and popularity of media vehicles and the systems on which they run. In addition, a set of simple, established navigation interfaces could help in addressing the difficulties that may be encountered by both a first-time and seasoned audience. The graphic user interface (GUI) design becomes important and should possibly be the subject of a stricter guideline.

- *Referencing system.* Should enhanced visual digital representation of architectural works be mainstream in the future and become a scholarly endeavour or information source, there must also be a standard system of referencing of such materials. This would depend primarily on the vehicles upon which the contents are to be distributed. For the web, there is already such a basic address referencing system in place.

2.6 | Digital Media - Opportunities and Considerations

Despite the short developmental history of the Internet technology and its availability, its popularity appears to surpass those of traditional methods of accessing information. This is not surprising because of the instant information retrieval that the Internet provides. Still, to capitalise on this facilitation to the fullest, improvement to the technology is needed and expected. This is especially true in the delivery of graphic-intensive visualisations such as those required for the presentation of educational architecture contents. In 2001, Meloni observed that the deployment of 3D graphics in consumer, commercial and educational applications had been slow (Meloni 2001). Although there is an improvement now, it has not picked up pace. However, the use of 3D graphics has continued to be predicted to rise with the faster broadband technology. Content creators need to take this into consideration so as not to forsake the necessary production quality for increased speed of current access.

Many projects, especially those in the area of heritage building preservation, have concentrated on the improvements of rapid data collection like 3D Laser scanning and photogrammetry (for examples, Amorim and Daniel 2005, Drap et al. 2006, Haala and Alshawabkeh 2006). While much data have been painstakingly collected and recording technologies have been improving to cater for this, there is also an urgent need to devise a convention to present the information to the general public in a readily understandable format.

Apart from representing built, proposed and historical works, digital (re)construction also extends to hypothetical recreation like the reconstruction of a Palladian villa which has never been built. The process is based on the construction rules of the already completed works of Palladio (Sass 2001). Although this project is not aimed for analytical study *per se*, the concept of extracting the grammar of the precedent works of an architect to justify the final product needs to be highlighted in the analytical work of any building in order to understand

its language, concept of formal arrangement, and details. Andre Brown states that digital reconstructions like the Palladian villas above are a necessary in order to engage in architectural critiques (Brown 2001). His study of the use of digital visualisations for enhanced architectural discourse focuses beyond analysis. It suggests that visualisations could serve as documentation records for theoreticians and historians to critique a design that is never built. Indeed, they also could also be extended to provide valuable information for the existing buildings of today for the same reason.

There have been many software applications and still more developments are being carried out to cater to the modeling of architectural forms and their rendering qualities. Despite the achievements and the sophistications of computer architectural models that allow close simulation of reality, few educational materials embrace their use. Are these high-quality outputs really necessary in educational materials? Pita suggests that in effect, virtual models today are beyond merely a form of representation (Pita 2005). They may have already become replacements of reality. In the cases of many virtual restitution or reconstruction projects, they are often the only 'reality' that exists.

To assist in the understanding of an architectural work, some visual architectural representations like animations should aim to visually depict as close to the true nature of the building as possible. 'Low-level geometric entities…. often [require] a time-and-thought-intensive process of translation' (Johnson 1997, p.10) and this process may adversely affect the retention of information. As Alexander Asanowicz's suggests too, there must be an 'adequate' level of quality suited to the aim of the presentation. On the other hand, Alexander Asanowicz argues that realism of representation is no longer valid when the representation becomes 'excessively realistic' (Asanowicz 2005, p.729) in that it does not reflect the actual. This argument will never cease unless we truly embrace the concept that representations and their referents are dissimilar and can never be the same.

2.7 | Summary

There have been several observations relating to the effectiveness of customary relationships between popular media addressed in this section. Presently, textual explanations with photographs as supports are still the most prevalent modes of representing architecture. Their relationship is often ambiguous largely due to the way they are presented which may have been resulted from the limitation of the media conduits or the lack of skill of the authors in balancing the various media.

A literature review fails to find any assessment of the effective implementation and sensitivity to media qualities in architectural publications. Such assessment is especially needed in the present context of media 'estuary' – a condition where the tradition intermixes with the new. The flow of non-digital conventions to the vast sea of digital opportunities has remained unchecked. Does the reclusive nature of consulting these publications effectively shield them from having their real contents questioned and thus remove them from the recognition they deserve in the teaching enterprise? Is this owed to the perception that architectural publications are inanimate objects, thus cannot be held accountable? Or have they become so effective that their positions are beyond reproach? Clearly, this is not the case. Has the academic circle just innocently overlooked acknowledging their presence and contributions? Could there be larger implications for such acknowledgement associated with the teaching profession?

From the previous examples of architectural publications which are representative of what are currently available today, they appear to be unwittingly abusing media by following tradition without thoroughly understanding their properties, those of the conduits and the larger implications to the audience. For a discipline that demands precision and explicitness in the documentation of its product for construction, the supposedly informative materials available to architectural students are

lacking in such qualities. Could this contradiction have more serious consequences and impacts on architectural graduates and practice than we actually realise or like to believe? We would be irresponsibly arrogant to dismiss this possibility, however difficult to prove it may be.

Already, works of architecture are often shrouded with mysteries of coded symbolisms that are rarely completely decipherable. Sometimes the language is not even clear to those who claim to truly understand it – the designers. Architecture in reality is not produced through definable, predictable 'aesthetic algorithms' as demonstrated by George Stiny's notion of shape grammar (Stiny 1975) and used in a current computer graphic visualisation to digitally mass produce 'buildings' (Mueller et al. 2006). In his writing, Dalibor Vesely argues that Miesian structure 'is sometimes situated in a broader sphere of meaning [which] may be available to the architect himself ….; but to those who are not initiated or have their own critical understanding, the argument must appear hermetic and illusory' (Vesely 2004 p.33). Most publications supposedly aim or are supposedly aimed to bridge between the built form and its meaning, shedding some light on the unexplained world of the architecture they feature. However, often translations do not serve as an effective mediation but become enigmatic pieces themselves, with answers only available to the authors. How could architectural publications be entrusted to a position to teach architectural works and the theories? On the other hand, how could they not attempt this role considering the alternatives are too limited?

Architecture is impossible to be completely 'textualised'. Indeed, it can never be fully replaced by any another object that represents it. Texts, as integral components to understanding design have been much explored. Wilson Wong and Thomas Kvan observe that textual information 'could assist the analysis in understanding the design rationale' (Wong and Kvan 1999, p.184). However, importantly, each abstraction, whether in texts or photographs, has to be executed in an integrated manner to be effective. Admittedly, neither one nor a

combination of any representation/s could ever depict the true nature of an architectural subject. As it is, even perceptions and thus interpretations of a particular building onsite may vary according to influencing elements that shape the moods and the journeys of the observers at that particular point in time.

Constant struggle in the delivery of architectural information in the digital era is apparent. Much concentration has been placed on the speed and the convenience aspects instead of the clarity of information delivered. Works like (Tunçer, Stouffs, and Sariyildiz 2001b), mentioned before, have researched the electronic retrieval of architectural information. There is also an attempt to devise a system to link or organise different types of abstractions. With the second order of presentation systems like this, clarity of information could only be achieved to a certain level; disintegration still exists within the web of information. More than the amount and the vehicles of information, the art of architectural information delivery needs to take precedence. Although, as Glanville claims, architecture is not totally a visual art (Glanville 1995, p.8), it is largely a form of visual art that require more than just texts to explain. It may require all types of media if that is what it takes for students to grasp the essence to enable them to apply learned concepts in their own practice.

There are still opportunities afforded by digital media which have yet to be capitalised upon by the current digital publications of architectural works. It seems that much of the concept behind limitations that exist in architectural representation in architectural publications need to be defined within the framework of the media and the platform that carries them. It would thus be a futile exercise to draw comparisons between digital or print publications. The re-[presentations] cannot be fairly judged from the perspective of the ‘real’ world either since any signifier and what it represents is non-equivalent. It is with this conviction and freedom that investigations of opportunities should be pursued.

Biases are inevitable. Once a representation is produced, a degree of media and author bias is certain to be introduced. Further, no one particular site condition in its physical sense could reasonably be taken to represent the 'truth' about the site condition over a period of time. A site experience thus, will only relay selected information of that particular time.

The tendency of directly transforming the traditional method of architectural representation into the new digital format is understandable in maintaining continuity of a particular established cultural object or condition. This is attributed to, and perhaps could be well explained by, the complex contexts of human cognitive conditioning, one's past experience or 'habitus'. Pierre Bourdieu's social theory addresses this relationship but this is outside the scope of this thesis. Thembisa Waetjen sums it up as follows:

> An agent's habitus is an active residue or sediment of his past that functions within his present, shaping his perception, thought, and action and thereby molding social practice in a regular way. (Waetjen 2001, p.83)

Despite society's conditioning, architectural information delivery deserves significant attention and conscious effort to develop new strategies and conventions for representation. In addition to descriptions of the methodologies and process of the research, the following chapters address several key considerations specifically for the rethinking of visual architectural information delivery in the digital realm.

Chapter 3 | *'Architecture | Media | Representations'* Survey

3.1 | Background

In the field of architectural education, the modes of lecturers' deliveries are constantly assessed and rightly so, for their performance and effectiveness in disseminating information or imparting knowledge. This is normally done through institution-wide student satisfaction surveys. But are lectures the only source of knowledge? As it is generally understood, in the process of understanding architecture, this is not entirely the case. Independent learning from precedents through alternative sources has formed an integral component and is much encouraged in architectural education. While there is an increasing use of interactive electronic delivery of information, it is time for a reassessment of the currently available architectural publications and their components in relation to the message recipients. The assessment of 'the educational system' should extend beyond the boundary of

classroom or studio settings as the term is often understood (for example, as in understood in (Glasser 2000). It must include other much-relied-upon sources of architectural information - specifically architectural publications, in our case.

The following survey assesses whether the available sources of information have really been effective and ultimately renders clues to areas of possible improvement in aspects of delivery. The collected data may be used both to examine the present scenario and to serve as a basis to drive the future direction of architectural information presentation.

3.2 | Survey Methodology

In establishing the criteria for an online survey, the following questions need to be addressed: What are the variables? How do we measure the performance aspects of architectural publications?

- The media and conduits of information do exert some influence. The availability and popularity of certain media types - i.e. texts, sketches, drafted drawings, photographs, video footage, animations - and the vehicles - i.e. books, journals/magazine, lectures, the Internet/computer, video documentary - would obviously 'massage' not just the attached messages, but the entire perception of the delivery and thus, effectively, the audience response to them. Therefore, these media and vehicles form part of the variables that need to be evaluated.

- Architecture is a multi-faceted subject that justifies equally multi-dimensional approaches and explanations of relevant factors to be understood. It is only fair that performance be measured in relation to factors that are dealt with in these approaches. In outlining these factors, consideration of key concerns are taken from *Experiencing*

Architecture (Rasmussen 1964), *The Language of Architecture* (Hesselgren 1969) and *Architecture, Form, Space and Order* (Ching 1996), which have served as established introductory guide to architectural study. Feedback from key-informants in the architectural education field are also taken into account in establishing additional relevant factors by which publication performance needs to be measured. After a consideration of the common factors discussed in existing architectural publications, some factors are selected, namely:

The form, The purpose/s, The spaces, The circulation paths, The use of artificial lights, The air quality, The social context, The cultural context, The political context, The history, The scale, The users/visitors' feedback, The daylight (shade/shadow), The acoustics /sound, The designers' explanation, The proportion, The temperature, The colour scheme, The immediate surroundings, The smell, The views, The construction method, The materials used & textures, The cost, The air movement/ventilation.

- Other aspects of media performance of interest deal with the characteristics or quality of information delivery and the users' perceptions of them. The aim is to provide an insight into the delivery qualities that might need addressing if design or implementation of a new method of architectural information presentation were explored. These qualities include: accessibility, clarity, appeal, coherence, organisation, completeness and immersivity of information.

- The selection of interviewees is aimed specifically at a pool of candidates with some degree of exposure to the media in their various forms (including digital). It also looks for interviewees that have experience in the process of searching for architectural information. This consideration consequently affects the methodology used in the call for participation. Survey announcements are made to relevant discussion groups on the

Internet, namely Archiseek.com, Pushpullbar.com, arch.designcommunity.com and Archnet.org, as well as academic circles in the field through electronic mail announcements, including members of the Association for Computer Aided Architectural Design in Asia (CAADRIA), Association for Computer Aided Design in Architecture (ACADIA), Education and Research in Computer Aided Architectural Design in Europe (eCAADe) and Sitio Oficial Sociedad Iberoamericana de Grafica Digital (SIGraDi). The online survey further ensures that participants have access to the internet as a source of information. These candidates (judging from the demographics and responses of those who finally participated), may already be well-acquainted with both digital and traditional approaches of information dissemination.

This survey has been conducted with the assumption that participants have equal access to different architectural information resources, and it acknowledges that the sampled audience is inherently familiar with internet use. However, its results may need to be interpreted in the context of the reality of the imbalanced access found in different countries and places.

Pilot Paper-based Survey Design

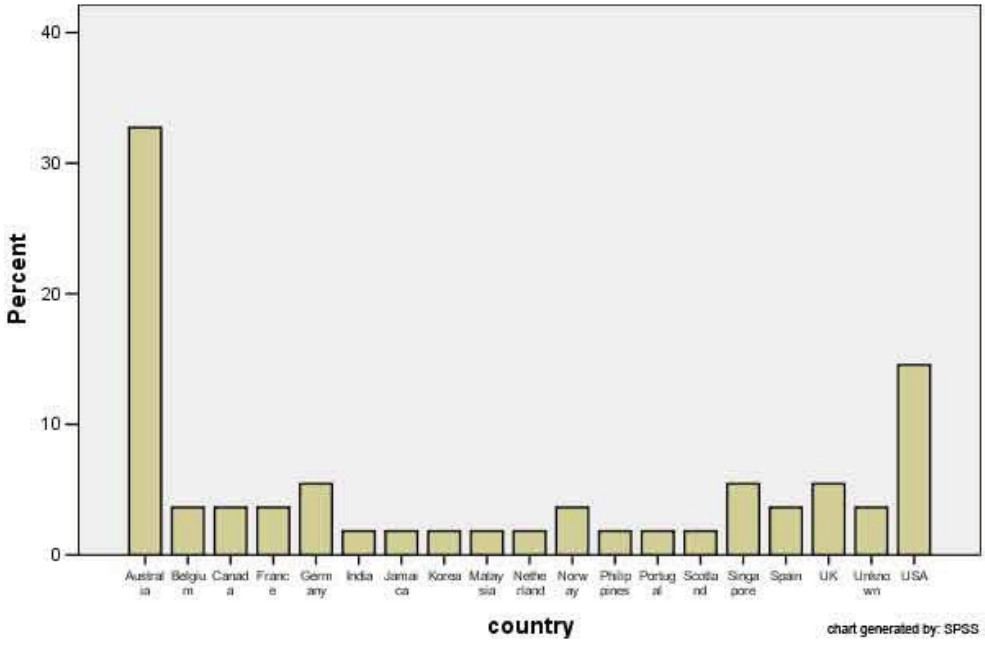
Prior to the implementation of the online survey, a paper-based pilot survey is conducted among a small pool of students at The School of Architecture, Landscape Architecture and Urban Design at The University of Adelaide. Their responses are analysed, and some formatting and redesign of questions have been performed to reduce ambiguity and consequent unexpected disparities of answers. For clarity, the responses from this pilot survey are not used in the following final online survey report and analyses.

Online Survey Design and Implementation

Based on the outcome and considerations arising out of the pilot survey, an online survey is designed and finalised. The online survey is made available for three months, during which time, numerous reminders are announced, and updates of the number of responses per countries are distributed in the forum announcements in order to attract more participation (Figure 3.1). As a result, there are 343 responses out of which 224 are valid. Invalid responses are generally blank since the system also captures any visitors who only navigate through the questions without providing any answer.

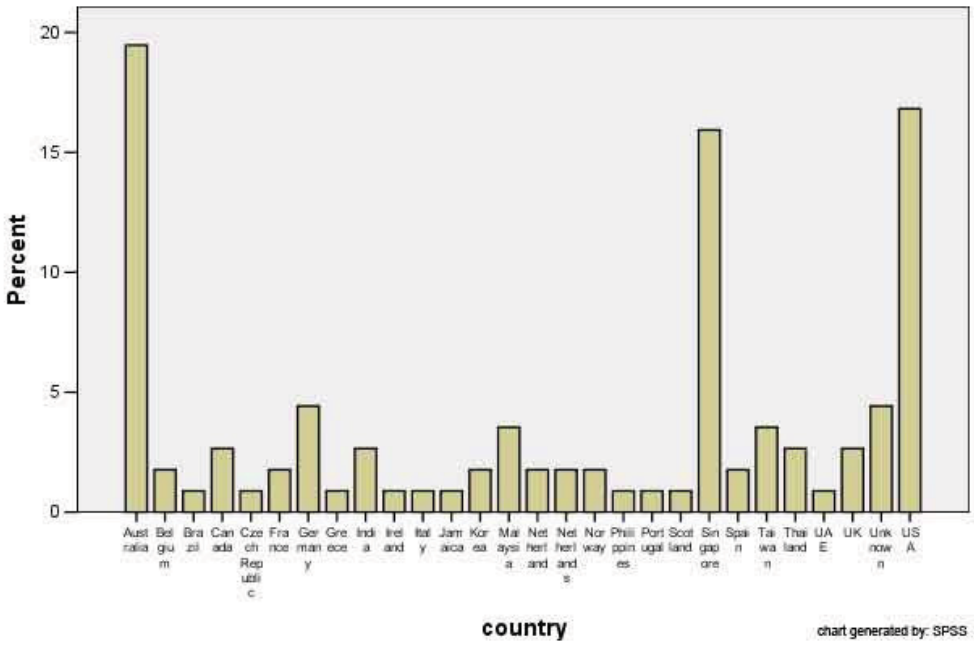
Architecture | Media | Representations

Percentage of Respondents by Country (as of Friday, 17 March 2006 at 00:12:12 GMT)



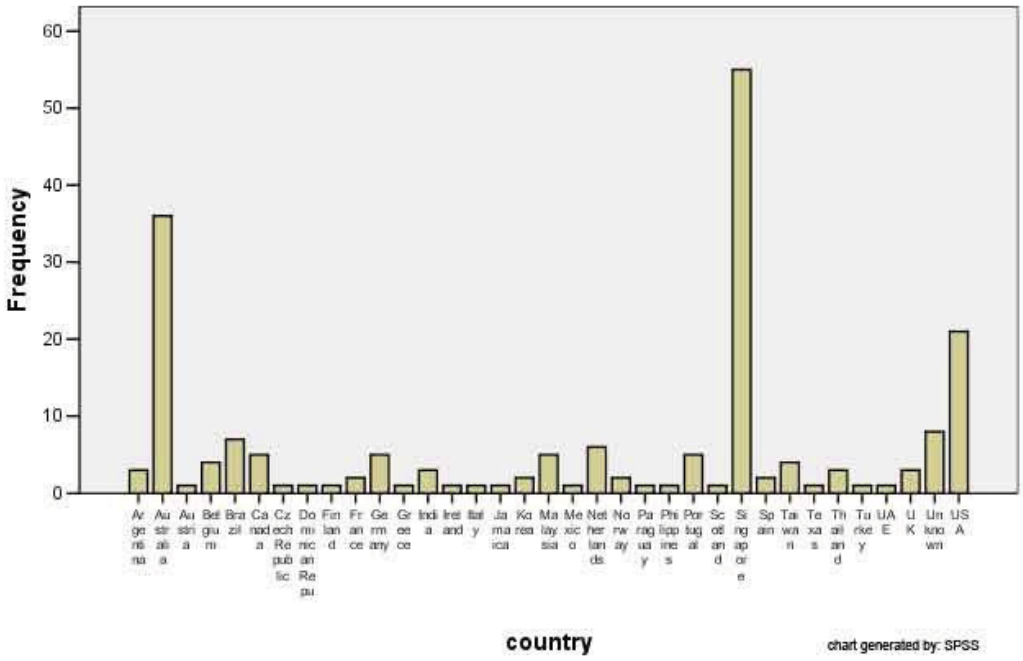
Architecture | Media | Representations

Percentage of Respondents by Country (as of Thursday, 23 March 2006 at 00:00:23)



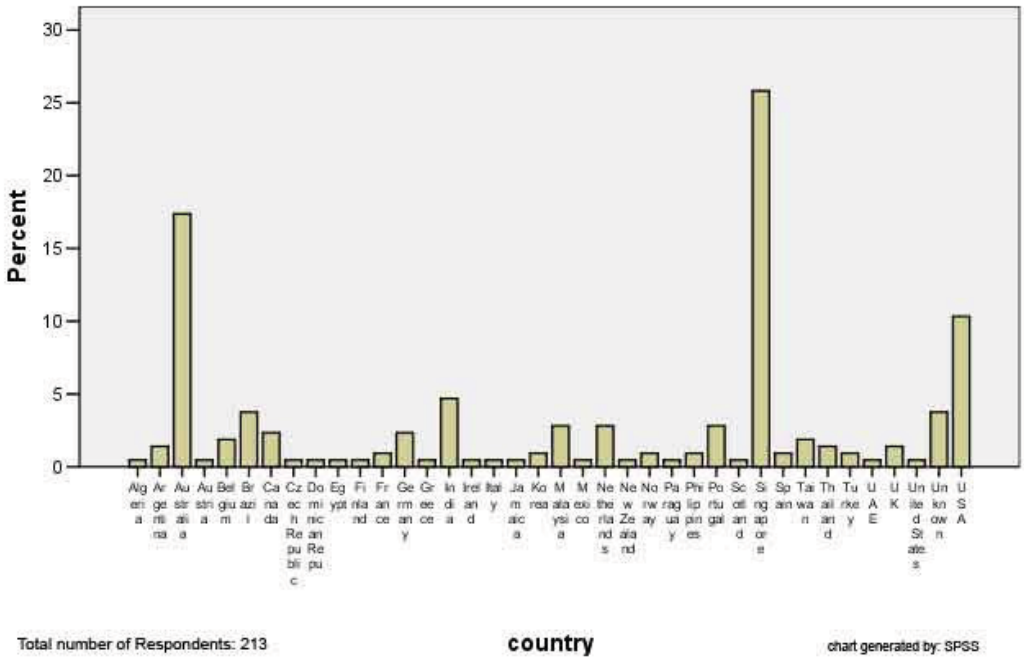
Architecture | Media | Representations

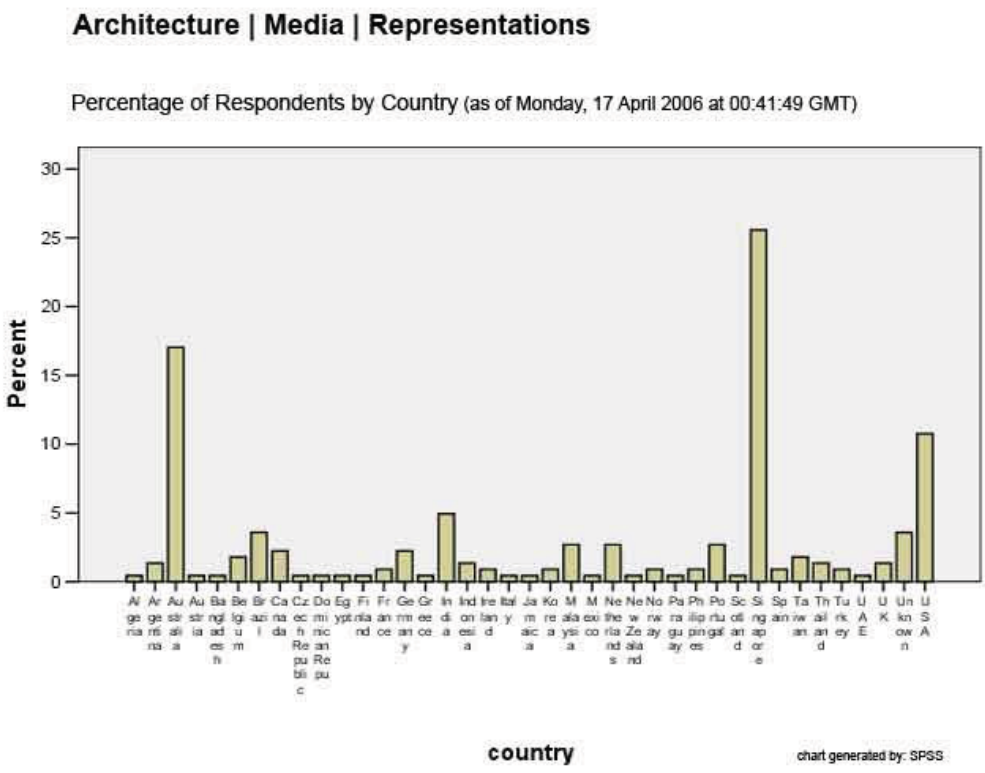
Percentage of Respondents by Country (as of Wednesday, 29 March 2006 at 06:23:26 GMT)



Architecture | Media | Representations

Percentage of Respondents by Country (as of Tuesday, 4 April 2006 at 06:21:33 GMT)





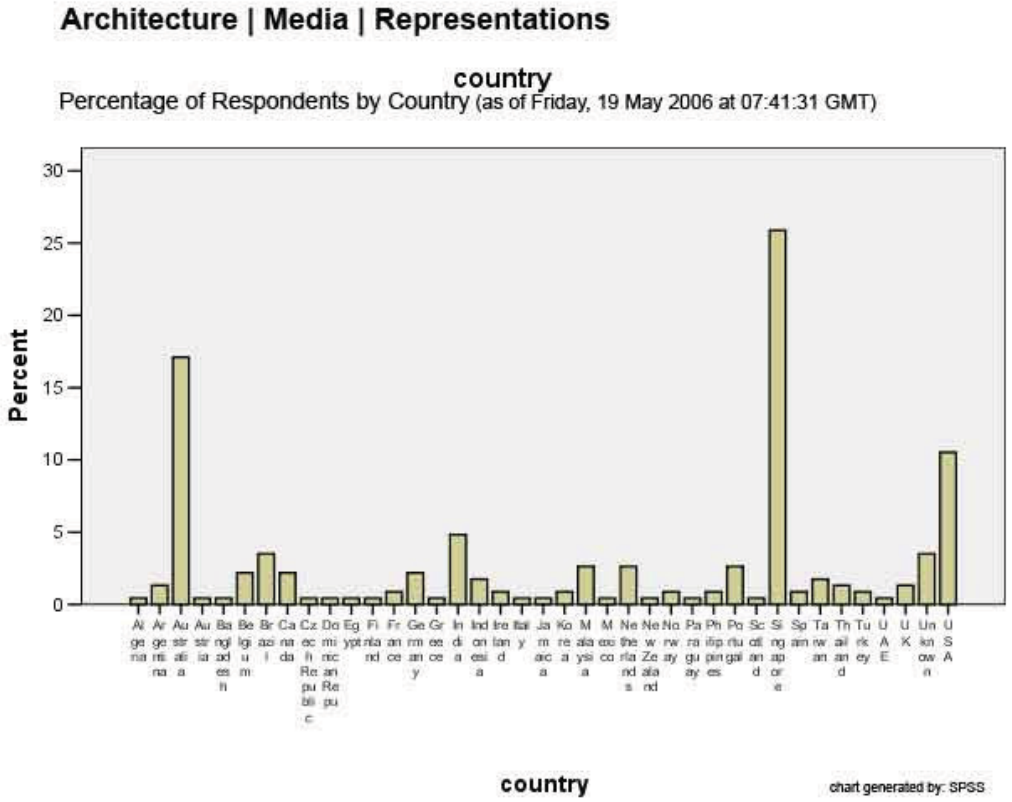


Figure 3.1 *Posted charts in online forums showing the progress of the survey.*

All raw data are transferred into an electronic spreadsheet and blank entries are discounted. The response data with final tabulation may be found in Appendix A.

3.2 | Survey Analysis

The following are analysis of the survey data collected in the period of 24 February to 31 May 2006. A statistical data analysis program, SPSS v.13, is utilised to assist in tabulating the results and calculation of frequencies. As mentioned, the data are further processed in a spreadsheet program to generate charts and graphs required for analysis.

Some answers are based on a Likert Scale of 1-7: Strongly disagree, disagree, slightly disagree, neither agree nor disagree, slightly agree, agree, strongly agree. Based on this scale, the following relevant sub-sections are particularly concerned with the combined positive responses – i.e. slightly agree, agree, strongly agree.

Demographics

First of all, the survey is represented by sections of samples with backgrounds described below.

Table 3.1 *Survey Demographics. (source: see Appendix A).*

c.	I am a:		
	Professions	**Response Percent**	**Response Total**
	First-Year Architecture Student	11.27	24
	Second-Year Architecture Student	11.74	25
	Third-Year Architecture Student	6.10	13
	Fourth-Year Architecture Student	7.51	16
	Advanced-Year Architecture Student	5.16	11
	Post-Graduate Student (Architecture)	10.33	22
	Full-time Lecturer/Professor	15.49	33
	Architect (graduate or registered)	19.25	41
	Others:	13.15	28
		Total Respondents:	213
		(skipped this question):	11

Table 3.1 confirms that most respondents have a background in architecture. This background indicates that they are likely to have genuinely searched for information pertaining to particular building/s in the past, thus making them suitable survey participants. This is further ascertained by the 93 percent who responded to the question that requests details of architectural works most recently studied.
The female to male ratio may have some effect on the overall response pattern; however, this thesis will not be investigating the differences of individual patterns between the sexes.

In total, there are 38 countries represented (Table 3.2). However, the distribution of the number of responses is not even. Since there are not sufficient responses for most countries to distinguish geographical differences of survey results, how the education, social and technological standards in each country may shape the data will not be deduced or examined.

Table 3.2 *Survey Country Distributions. (source: see Appendix A).*

b.	Country		
	Countries	**Response Percent**	**Response Total**
	Algeria	0.46	1
	Argentina	1.39	3
	Australia	16.20	35
	Austria	0.46	1
	Bangladesh	0.46	1
	Belgium	2.31	5
	Brazil	3.24	7
	Canada	2.31	5
	Czech Republic	0.46	1
	Dominican Repu	0.46	1
	Egypt	0.46	1
	France	0.93	2
	Germany	2.31	5
	Greece	0.46	1
	India	6.02	13
	Indonesia	1.85	4
	Ireland	1.39	3
	Italy	0.46	1
	Jamaica	0.46	1
	Jordan	0.46	1
	Korea	0.93	2
	Malaysia	2.78	6
	Mexico	0.46	1
	Netherlands	2.78	6
	New Zealand	0.46	1
	Norway	0.93	2
	Paraguay	0.46	1
	Philippines	0.93	2
	Portugal	2.78	6
	Scotland	0.46	1
	Singapore	26.39	57
	Spain	0.93	2
	Taiwan	1.85	4
	Thailand	1.39	3
	Turkey	0.93	2
	UAE	0.46	1
	UK	1.39	3
	USA	11.11	24
		Total Respondents:	216
		(skipped this question):	8

Resources and Media

When participants are asked what resources that they look at in their recent study of architectural works, most have responded 'the Internet/Computer' (Table 3.3), surpassing the traditional means such as books or journals. This is understandable since the Internet is currently the most accessible source of information. As this is an internet-based survey, it is understood they do have access to this convenient online facility. Since more comprehensive, reliable materials are still perceived to be found in the traditional sources, the gap between the internet and books as sources of information is not significant. However, there could be a likely possibility for this gap to widen in the future considering that the internet has already outrivaled books as a relied-upon information source despite its early history.

Table 3.3 *Resources upon which participants have relied on. (source: see Appendix A).*

2	In studying this architecture, where have you obtained your information from?		
	Resources	**Response Percent**	**Response Total**
	Books	62.61	139
	Journal(s)/Magazine(s)	55.41	123
	Lectures	27.93	62
	The Internet/Computer	72.52	161
	Video documentary(s)	13.51	30
	Others	10.81	24
		Total Respondents:	222
		(skipped this question):	2

Most resources are shown to rely heavily on photographs and texts to explain the multi-facetted subject of architecture (Table 3.4). Presumably, the types of chosen media are based on authors' preferences and judgments which could be due to economical and skill factors. In any publication, an author's bias is unavoidable. In this case,

the selection and use of media do exert some influence both on the information and the level of the audience understanding as shall be suggested at later sections, while possibly contributing to further unintended biases.

Table 3.4 *Media used in the resources. (source: see Appendix A).*

3	Do the resources you selected above include any of the following?		
	Media	**Response Percent**	**Response Total**
	Texts (written or spoken)	89.24	199
	Sketches	55.16	123
	Drafted drawings (plans, etc)	64.13	143
	Photographs of the building/place	90.13	201
	Photographs/pictures of models	49.78	111
	Video footage of the building/place	15.25	34
	Computer animations	17.04	38
	Others:	3.59	8
		Total Respondents:	223
		(skipped this question):	1

Factors: Importance and Understanding Scales

The following sub-section analyses participants' perception of the importance of listed factors and how they think the resources have assisted them in their own process of understanding the architecture of their choice. The lines in this line chart and the subsequent ones are used instead of the usual bar charts for personal clarity purposes. These lines do not indicate the fluctuation of percentage values, but are only used to visually differentiate the types of answers.

With the exception of 'the colour scheme', current architectural publications appear to provide participants with an understanding level that is consistently lower than the degree of importance that they assign to each factor (see Figure 3.2). This may suggest the dissatisfaction of respondents with the current resources in explaining the factors to the level of understanding they seek.

The resultant understanding level of 'the colour scheme' exceeding the level of importance may be attributed to the availability of (colour) photographs in most publications. This is well-supported by the figure in Table 3.4 which reflects 'photographs' as the most frequently used media in the available resources participants have looked at. Understandably and as clearly depicted, the nature of these two-dimensional photographs, does not contribute to a deeper understanding level of other factors – e.g. form, spaces, proportion, etc. - which may also be shown in static photographs.

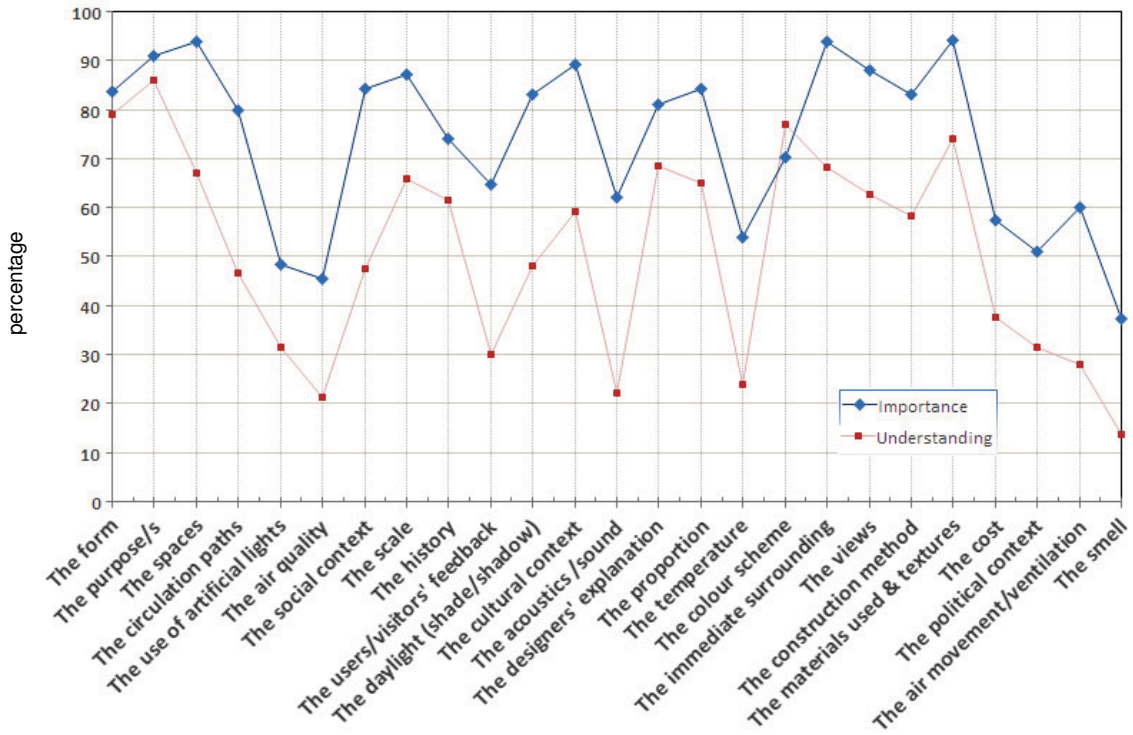


Figure 3.2 *Scales of Importance vs Understanding.*

Note: Lines in line charts are used instead of the usual bar charts for personal clarity purposes. These lines do not indicate the fluctuation of percentage values, but only differentiate the types of answers.

Factors: Importance Ranking

The distribution chart below (Figure 3.3) shows ranks of factors of importance relative to the median value as perceived by the survey respondents. This median value only serves as a visual 'benchmark' and does not suggest that some factors are insignificant. However, they do reflect the general audience perception of what they regard as important in order to understand architectural works.

Does the perception pattern correspond with the current level of information covered in most available architectural publications? Has this perception been conditioned by their current content? The answers can only be a conjecture. For this to be fairly assessed published works need to be studied in extensive detail but that is beyond the scope of this thesis.

Within the field of architecture, a set of specialised interest areas do exist. Therefore, although this ranking may reflect the preferences of a general audience, it may not entirely be applicable to specific targeted groups. Nonetheless, as a rough general guide on areas to investigate, disregarding biases, this could prove useful for authors in their selection of information types to be included in their architectural publications.

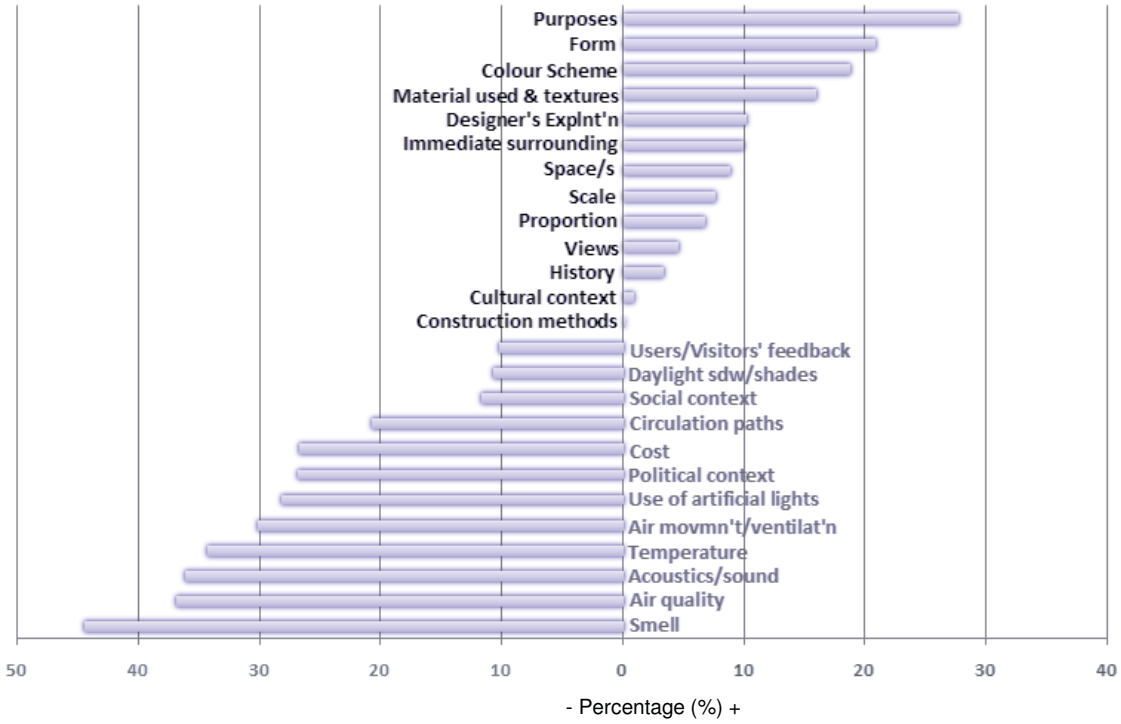


Figure 3.3 *Perceived 'importance' scale of factors in relation to the median value.*

How Should Architecture be Represented?

One theme that occurs often is the demand for more use of particular media types, vehicles or features – e.g. inclusion of animations, texts, sketches, models, design processes, movies, videos, etc. Could the provisions of these necessarily assist in augmenting the comprehension level? Does it reveal the lack of media vehicles or does it expose the poor delivery techniques of the existing ones? There seems to be sufficient ways of presenting architectural information given the list that participants suggest, but not all of these have been appropriately deployed or included at all in most publications that exist today. Some obvious reasons might be cost, time and the skills associated with producing a high quality publication of an architectural work. To avoid forsaking several of the more significant issues in effective delivery (such as whom this information is targeted for, how important it is for the audience to understand the message, etc) these difficulties, although

understandable, are not impossible to overcome and need to be critically addressed.

Media/Resources Qualities

The conditions and quality could impact both the acceptance of media/resources and the recipients' understanding of the relayed messages. The total percentages of participants who rated accessibility, clarity, appeal, coherence, organisation, completeness and immersive-ness of information as 'slightly important', 'important' and 'extremely important' are relatively and almost consistently high (Figure 3.4). The almost-horizontal blue line across the chart indicates only slight differences in the 'importance' percentages between these quality factors.

On the other hand, participants rank the performance of the resources they obtained (Figure 3.4 – red line) in terms of the above factors lower than they rank the importance scale. This reflects the significantly lower-than-desired performance of current resources in all these aspects, markedly on 'immersive-ness', 'completeness', 'coherence' and 'organisation of information' (most of these are also well-supported by the findings in Chapter 2). Could the popularity of digital content change this in the future? Unless there is an improvement in delivery techniques beyond mere transformations of their print cousins onto the digital platform with hyperlinks, we may not expect to see the performance level increase much more. Unfortunately, in their present state, most of the architectural material delivery techniques in digital format have not developed in parallel with, and to take advantage of, what the technology could actually facilitate – hence, perhaps, the graph pattern.

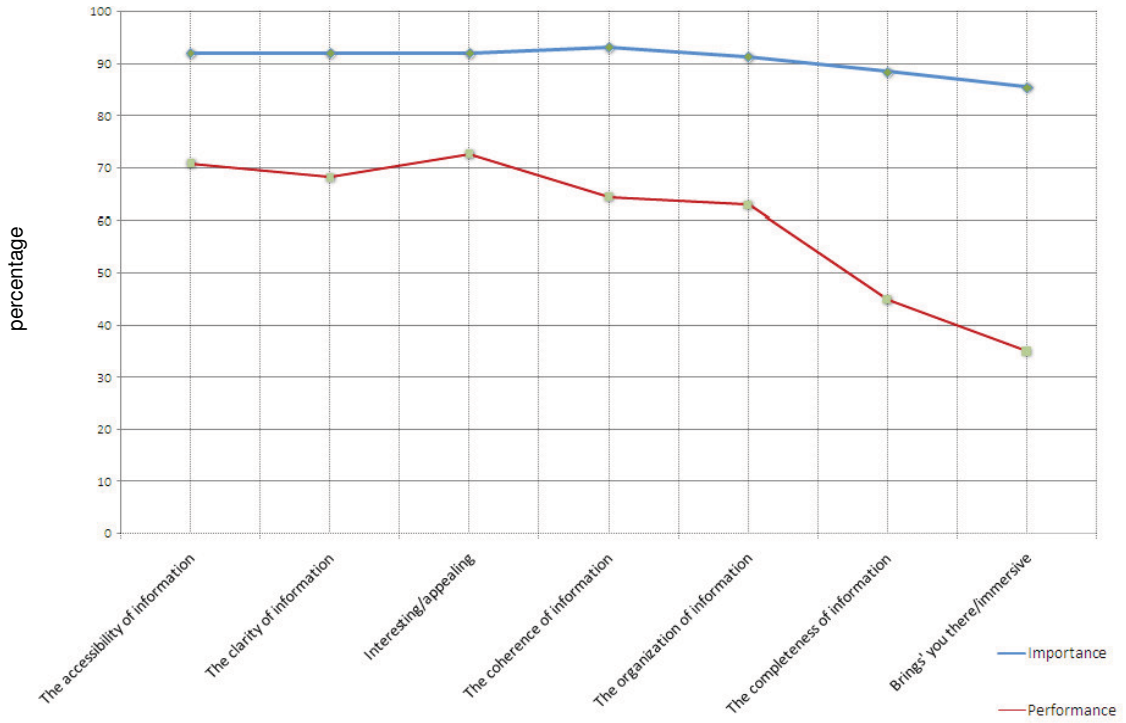


Figure 3.4 *How participants weigh aspects of resources in terms of importance and their performance.*

Note: Lines in line charts are used instead of the usual bar charts for personal clarity purposes. These lines do not indicate the fluctuation of percentage values, but only differentiate the types of answers.

Media Assessment

How important are various kinds of media regarded and how effective are they in enabling the understanding of architectural works? These are also the questions posed to the survey participants.

Figure 3.5a indicates how participants perceive the roles of texts, sketches, drafted drawings, onsite photographs, photographs of models, onsite video footages and computer animations in their importance and assistance in the process of understanding architecture. Again the pattern of answers appears to indicate the perceived sub-performance of these media in helping participants understand architecture. It is important to note, however, that in most cases, it may be difficult for respondents to gauge precisely how each of the media would contribute to their understanding. Most, if not all, architectural publications contain

a mix of more than one medium and, to a certain level, a complementary relationship between these media may exist which helps lower the degree of abstraction. As such, if each medium were truly assessed separately in its own right, we may expect the level of understanding to be lower than shown.

If we overlay the response of the previous survey answers about the availability of the media used in current resources (Table 3.4), we can investigate any correlation between this availability and how respondents rate the importance and understanding aspects (Figure 3.5b). When the presence of a media seems to be low, their understanding level is also low. Could this be due to cultural influence or conditioning? Interestingly, the conspicuously high presence levels of texts and photographs also bring them close to their corresponding levels of understanding and importance. This may indicate that these media are nearing or have reached their peak performances. It also suggests the under-utilisation and opportunity for greater engagement of other media in the delivery of architectural information.

When asked which single medium or combination of media would assist them best, again, participants' responses are varied but most have indicated the preference for visual media with the highest frequently mentioned being '(drafted) drawings'. Often, in architectural publications, drawings have not been a primary medium that authors use to explain designs. At times they are unjustifiably printed small with illegible details and other times grossly oversimplified to the extent of being abstracted for their graphic aesthetics; this kind of poor delivery, unfortunately is happening not only with printed publications, but interestingly also replicated in CD-ROM digital content (see Critique 2 in Chapter 2 for examples).

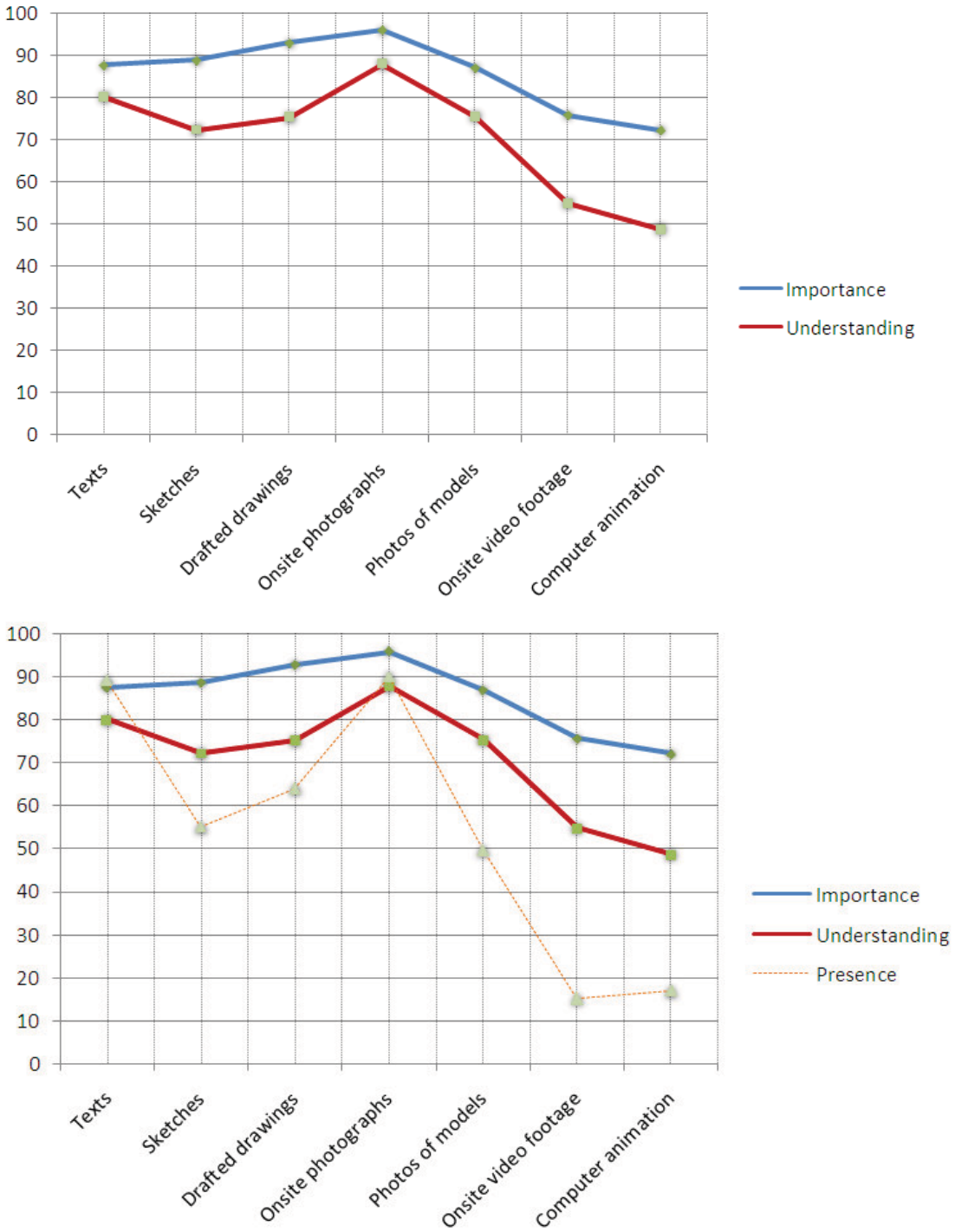


Figure 3.5 a/b *Importance of media, contribution to understanding architecture and media presence in publications.*

Note: Lines in line charts are used instead of the usual bar charts for personal clarity purposes. These lines do not indicate the fluctuation of percentage values, but only differentiate the types of answers.

Resource Preferences

It is clear from the bar chart above (Figure 3.6) that at present, books are still the most preferred sources of architectural information. Many survey participants have stipulated that the reasons for this choice are the reliability of content and the possibility of self-immersion or interpretation. It may also be argued that the popularity of books could have been attributed more to the established nature of the media in terms of social acceptance than content reliability and perhaps also their cultural symbolism which entails their traditional association to 'scholarly' prestige – a possible issue that renders comparable content and structure found in magazines today not being as highly regarded. However, studying Table 3.3 again, it is interesting to note that preference does not necessarily translate to practice. There appears to be more respondents who source information from the Internet than from books.

One respondent astutely remarks that his preference for texts to describe building is based on the reason that it is like reading a story book. It is perhaps cultural or habitual that elements which trigger imaginations are preferred over the more factual objects of representations as escapism into the 'ideals'. This yearning to escape from reality in the comfort of one's environment may contribute to the outcome that books are preferred over onsite visits as sources of information. Another reason may be that at present, a typical book may contain more authoritative content than any other source.

The internet is also highly ranked as a preferred information source despite its relatively short developmental history compared to more established resources. Most participants have expressed accessibility as the main factor for this preference. In settings where all facilities are available, the immediacy of information retrieval through the internet is unrivalled. If the standard of content could be improved and controlled, it

appears likely that the internet may be the only medium that could substantially overtake the popularity of books in the future. However, to exceed the traditional media in its effectiveness in delivering content, aspects of digital delivery need to be studied more closely.

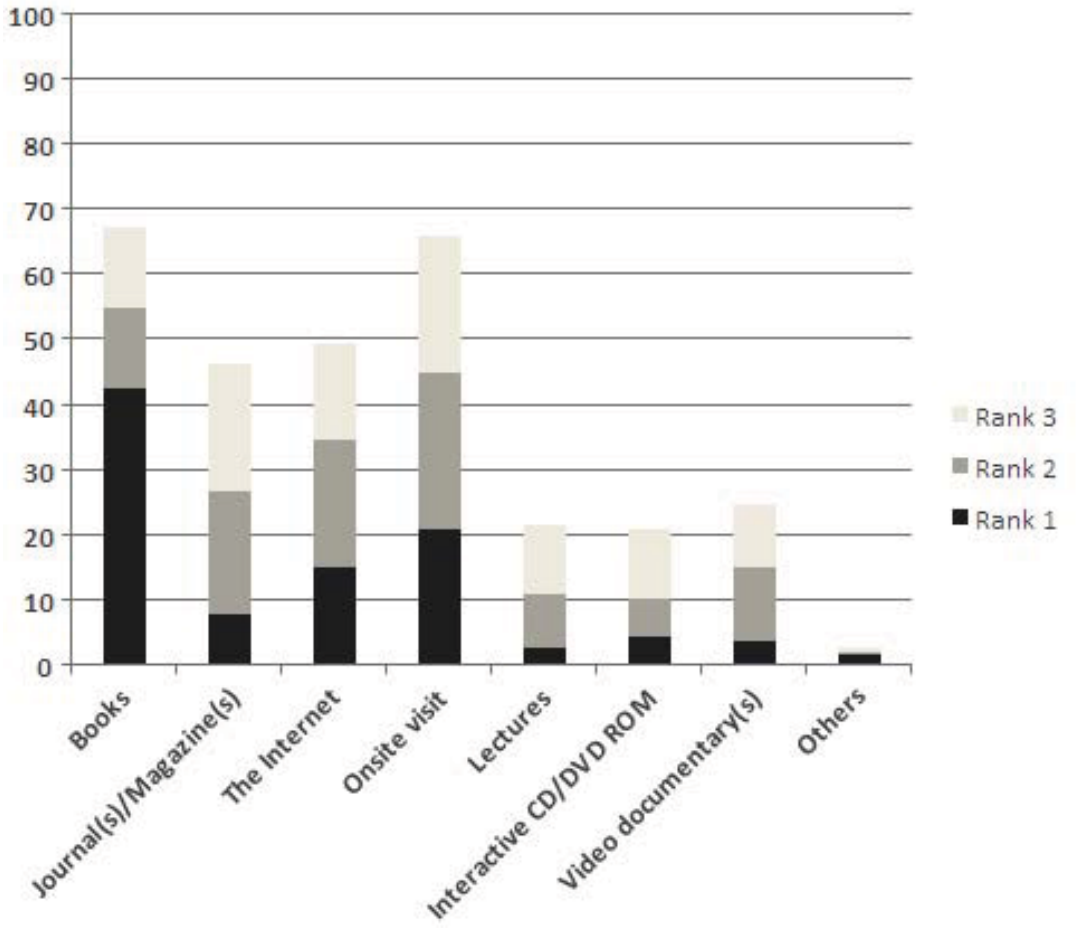


Figure 3.6 *Preference ranking.*

3.4 | Summary

To propose possible opportunities and direction for future architectural publications, it is necessary to carry out a performance assessment. The assessment is to gauge the effectiveness and the presence of media in these publications and how well they relay certain aspects of

architecture. It also evaluates the qualities deemed important and the popularity of particular types of publications among their audience.

The conducted survey has basically shown that:

- The Internet/computer has surpassed the traditional means of sourcing for architectural information.

- Currently, there is a heavy reliance mainly on photographs and texts to present architectural publications.

- The performance of current publications in explaining most aspects of architecture has not reached the expectation levels of the audience.

- There is an audience demand for architectural publications to use various media in explaining aspects of architecture.

- The overall qualities of architectural publications need improvement.

- The level of presence of media could affect their performance in explaining architecture.

- Although the Internet are the most popular, books are still preferred as an information source at this time.

The online survey results have shed some lights on the needs to address significant issues in architectural publications from the perspective of the audience. It has also provided important insights into the presence and performance of media within architectural publications and how they have been commonly utilised. Equipped with this understanding, digital architectural publications could steer themselves in a direction which would be more audience-oriented. The survey results are admittedly time-specific and may change as more

alternatives to information deliveries and their vehicles become available in the future. Understandably, such dependency of survey results is due to the changing learning habits and preferences that could be facilitated by the development of the learning environment.