

# Say what you do and do what you say

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*In the forthcoming globalisation and virtual almost everything, we are indeed reliving a moment of history when, at the turn of the century, machines replace craftsman in mass-producing goods quicker, cheaper, 'better' and faster for the mass market regardless of the appropriateness in using the machine. So much so that the recent proliferation of computer graphics has reached a stage where many are questioning their validity and usefulness in the advancement of architectural discourse. This paper argues that the pedagogy of the use of the new tools should be effective communication in vision and in representation. In short, saying what you do and doing what you say, no more and no less, or to be 'true' and 'honest'. The paper tries to provide a hypothetical framework whereby the rationale of drawing could be more systematically understood and criticised, and it reports ways the framework is introduced in the teaching of design studio. The focus of the experimental studio (Active Studio 1.6 beta) is to enable the substantiation of ideas and feelings through a critical manipulation of medium and techniques. The results are narratives whereby the expression of intention as well as the drawings are both on trial.*

## 1.0 Prelude

According to ancient wisdom, architects make images from ideas. Theologians were fond of quoting St Thomas Aquinas on this theme. An architect, wrote Aquinas, first has an idea of a house and then he builds it. God made the world in a similar fashion. Aquinas's architect still haunts us; he thinks, therefore he draws. He draws the bodiless but fully formed ideas from the mind and puts them on paper, just as Ernst the elder put trees on canvas. But Aquinas's architect is a figment. There may be such creatures, but they would not be possessed of much in the way of creativity; quite the contrary. Imagining with the eyes closed, as if the whole world were held in the mind, is an impossible solipsism. The imagination works with eyes open. It alters and is altered by what is seen. The problem is that if we admit this, then the relation between ideas and things turns unstable and inconstant. Such deliberation is bound to affect our understanding of architectural drawing, which occupies the most uncertain, negotiable position of all, along the main thoroughfare between ideas and things. For this same reason, drawing may be proposed as the principal locus of conjecture in architecture.<sup>2</sup>

## 2.0 A dialectic observation

Rumour has it that not that long ago a certain famous painter took the opportunity to paint a seated lady. After a number of sessions, the model was revealed the finished painting and she was duly shocked. What was in front of her was a 'beast' which could hardly be called human. The model complained but the painter calmly replied while putting the finishing touch to his work that: don't worry my dear, you will one day grow to look more like it. The painter was Pablo Picasso and the painting Seated Woman, 1920.

Regardless of the source and accuracy of the rumour, there are two ways to interpret the story. One way to look at this is that the painting was painted in such a way that when studied closely the inter essence of the model could be detected 'between the stokes', and that the value of the representation was not to bring out the physical being of the model but rather was to extract her personality and character. The painting was conceived as an abstraction of the model. The other way to look at this is that the painting was a visionary depiction of a trend, and as such in future it would be perceived and accepted as if it was a true copy of the model. In short, the painting was conceived as an abstraction of the social construct. Whilst the first abstraction is to bring the viewers closer to the qualities of the model, the second is to aspire the viewers to see the model in a different light. In other words, the first is a representation of the object and the second is a manifesto of a vision.

The dialectic observations of the event haunts us as architects, for it challenges our notion of what a painting should be? What is it trying to do? And what is it trying to say? The answer, as illustrated, may not lie in the painting itself, but rather in the subject, the intention and the process which lead to the final production.

### 3.0 Drawing as a theme and as theses

Architecture is a visual practice, and drawings are fundamental to the pursuit of this art form. The practice of drawing did not come from architecture. Prehistoric hunting-gathering societies could draw before they could build - as ritual image, as sympathetic magic, and as story-telling, drawing has served as a totem, a palladium, a mnemonic, and as an important instrument of human creative practice. Furthermore, materially constituted, drawing is at once a phenomenal representation of a conceptual practice ; an idea, an act as well as an object. It is not for nothing that Gehard of Brugge argued, "The art of drawing ... may justly be called a bearing mother of all arts and sciences whatever ... The art of drawing is the beginning and end, or finisher of all things imaginable."<sup>3</sup>

Such is the significance attributed to the practice of drawing that no shortage of academic expositions has been spared on the subject.<sup>4</sup> A research of the texts reveal that regardless of the various authors' and designers' view points and preoccupation, a theme of construct seems to have run through their theses. This is summarised in Figure 1. For example, Edward Cullinan is known to have revealed that 'within' the client/architect interaction, the need 'to' communicate 'for' the purpose of clarification could be achieved 'with' plans and sections drawn 'using' thin but clean lines, and 'using' them as templates to doodle over.<sup>5</sup> A summary of words used by architects to describe their approaches to drawing is summarised in Figure2.<sup>6</sup>

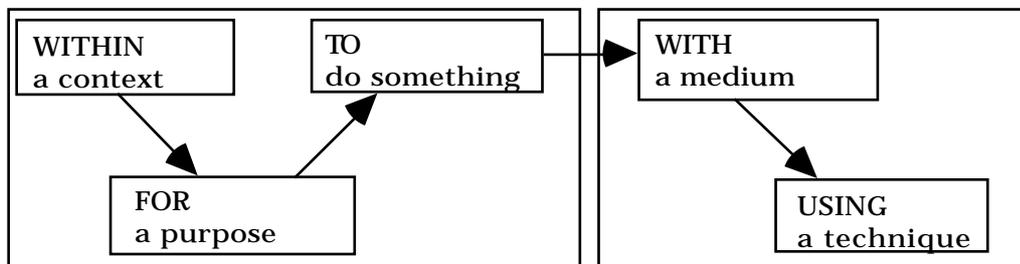


Figure 1 a theme of drawing

WITHIN	Self: idea formulation, initial design, scheme design, detail design, production design. Collaborative, architect vs: architect, client, consultant, contractor, specialist, user. Informative, architect vs: public, authorities, client, consultant, ....
TO	communicate, record, illustrate, suggest, cement, educate, share, avoid, join, present, clarify, direct, order, guide, dialogue, visualise, explore, convey, structure, sell, explain, discuss, provoke, measure, co-ordinate, interpret, sense, craft, be understood, intimidate, mystify, test, feel.
FOR	idea, point, concept, statement, development, process, theory, identity, construct, making, production, background, rationale, scale, actual condition, organisation, itself.
WITH	plan, section, elevation, model, perspective, axonometric, isometric, painting, collage, word, report, sketch, doodle.
USING	worm eye, exhaustive, direct, realistic, reproduction, freedom, precise, softness, slightly above, large, concise, quick, distance, exaggeration, embryonic.

Figure 2 Vocabulary used to construct a theme for drawing

An understanding of the theme and the vocabulary used for drawing in architecture is crucial in our investigation into the role played by drawing in the practice of architecture. In Figure 1, the theme is constructed of five keywords. The three keywords bound by the left hand side of the theme can be regarded as the reason for the need of drawings while the two keywords on the right is about method and technique. In summary, the keyword 'WITHIN' denotes the overall environmental context justifying the need for drawing. The designers' need to respond to the context is denoted by the keywords 'TO' and 'FOR', while the medium and technique which could be employed for the task at hand is given by the keywords 'WITH' and 'USING'. Thus, working in reverse, a technique or a medium could only be meaningful if the environmental context and the need to

respond to it is known. As such, for example, Picasso' Seat Woman could not have been understood if the broad environmental context upon which the painting is based is not known. In hindsight, it appears that the value of the painting, as constructed by the painter, is more of a manifesto towards a vision than of a representation of the model.

#### 4.0 A Vision or a Representation

As Robbins pointed out, a drawing could be a representational construct of an object, or itself an object which denotes a vision.<sup>7</sup> As a representation, drawing yields to an apparently intractable web of everyday institutions, rules and social forms. It is constrained, to the extent that the ultimate goal is to become a built object, by the professions, institutions, economies, and the social practice of production. On the other hand, as a vision, drawing manifest a subjective and tractable everyday world of ideas, and the infinitude of possibility defined by our capacity to symbol. It is free of reality and constraints. It can be reveal, and even revel in, its own biases and notions about utopia, perfection, or any other thesis it is there to address.

To understand more fully the role of drawing as a vision and as a representation, the theme of drawing developed above is used to provide a systematic framework of investigation. A semantic differential matrix is constructed providing a ranking of words used by architects against the 5 keywords (within-to-for-with-using) under either the heading of representation or vision. The matrix is used to inform the researchers the perceptual classification of the meanings of words used by architects as well as the significance of each word in achieving the notion of representation and/or vision. A brief survey was conducted with designers ranging from university students to experienced architects in practice. A summary of their responses is captured in Figure 3.

	keyword	low	high
representation	within	self	client, architect, authority, contractor, consultant, public
	to	feel, mystify, suggest, join, intimidate	illustrate, educate, communicate, record, share, avoid, present, cement, clarify, order, be direct understood
	for	idea, concept, theory, statement, development, process, itself	point, identity, actual condition, construct, making organisation,
	with	sketch, doodle word, collage, conceptmodel	section, isometric, plan, elevation, report axonometric, perspective, model
	using	worm eye, freedom, softness, distance, quick, embryonic, exaggeration	exhaustive, slightly direct, realistic, above, large, concise reproduction, precise
vision	within	authority, contractor public	client, public self, consultant
	to	record, cement, communicate, suggest, discuss, feel, explore, mystify, educate, share, illustrate, dialogue, interpret, test, intimidate, provoke, present, clarify, be explain	visualise
	for	construct, making, development, process, production, actual scale, condition, organisation	statement, identity, idea, point, concept, background, rationale, itself theory
	with	report, model plan, isometric, concept model, perspective	collage, section, sketch, doodle, word elevation, axonometric
using	concise, direct, exhaustive, slightly quick, freedom, worm eye, embryonic, precise above, large, realistic exaggeration	softness,	

Figure 2 A semantic differential scale of 'words used by architects'

The survey reveals some interesting thoughts, not least of which is the apparent difficulties architects have in trying to put exact meaning to words. The most common query to the researchers is 'it depends'. Though there is still scope for further clarification and notwithstanding the limitation of a survey like this in extracting information on the complex issue of drawing in the context of the design process, a general pattern seems to have arisen which serves to differentiate the theme for representation and that for vision. In summary:

- Basic and simple sketches and doodles seems to be effective both for representation and for vision.
- Interestingly enough, orthogonal drawings are ranked more appropriately than sophisticated 3D drawings for representation due to their dimensional consistency and 'independent of view point'. Likewise, doodles and sketches are preferred for the freedom

and ambiguity they offered. They are also used for their speed and simplicity.

- The viewpoint of a 3D drawing has an impact on its effectiveness for. A change of viewpoint is reckoned to have an impact on shifting a drawing's emphasis from one of representation to one of vision.

- The proportion of the 'useful' and informative portion of the drawing against the background material could be used to denote the degree of 'vision' of an idea. In general the greater the proportion, the more definitive an idea.

Perhaps the most important thing to note is that the act of drawing is not neutral and could not be indiscriminately appointed. The notion that a design could be viewed and presented independent of its creation is not endorsed in the research findings. On the contrary, architects are found to constantly reviewing and correcting their drawing to conform to their own interpretation to a need in practice. It is recognised that some categories of drawings are more suitable than others, and that the technique and discretion used in the execution and in the process are as important as the forming of the design idea in the first place, or else, as Eisenstein summed it up very nicely, 'When ideas are detached from the media used to transmit them, they are cut off from the historical forces that shape them.'<sup>8</sup>

## 5.0 A dilemma of Computer Aided Drawing

We now arrive at the central thesis of this paper. The recent proliferation of computer graphics has reached a stage that many are questioning their validity and usefulness in the advancement of architectural design.<sup>9</sup> Surely, we can argue that it is a must for the forthcoming globalisation, internationalisation, just-in-time, concurrent design, tele-conferencing, remote synchronisation, and virtual almost everything. And if we are not doing it, we may risk missing the boat! But are we just jumping onto the wagon without first knowing where it is heading or, worse still, are we simply reliving a moment of time when, at the turn of the century, machine replacing craftsman in mass-producing all sorts of goods to satisfy the mass 'market' without due care paid to the authenticity of the new tool. Surely, it is easier, quicker, cheaper, 'better' and faster, but are we doing all these and at the same time missing the point, or worse still further dissociate the act of architecture from the act of design?<sup>10</sup>

### 5.1 The problem of Structure

When Maya Ying Lin won the competition to design the Vietnam Veterans Memorial in Washington, D.C., problems arisen as to how to engraved the names onto the black granite. To many the straight forward answer was to do it alphabetically. So 600 Smiths would belisted together and 16 James Jones would be side by side of each other irrespective of the events and personal particulars of the individual. In short, it is going to look like a telephone book. But Maya disagreed insisting that they should be listed by date of death, she wrote, " ... chronological listing was essential the design. War veterans would find their story told, and their friends remembered, in the panel that corresponds with their tour of duty in Vietnam. Locating specific names with the aid of a directory would be like finding bodies on a battlefield."<sup>11</sup>

The structuring of the names serves a number of functions. It memorialises each person who died. It makes the mark adding up the total. And it indicates the sequence and approximate date of death. The spirit of the individual as synergised on the wall, both of each death and of each visitor, decisively affects how we see the interaction. The deaths are no longer mere memories, they are the actors, their names are lyrics. And the visitors are no mere tourists, they are part of an architectural performance, as colleagues of the deaths.

Now imagine that Maya were not to decide the listing of the deaths. Instead she is going to choose from say one of the five methods of listing presented to her by her computer software, and let say the five methods are by ascending order, by descending order, by rank of office, by States and by the colour of their eyes. So what is going to happen? If either by ascending or by descending order is chosen, the memorial will look like a gigantic phone book. If by rank of office is chosen, the memorial will be a symbol of status where the first name is the most important and the rest are just happening to be there. If by States is chosen, the memorial will be a statistics table denoting the contribution of the various regions. And if by the colour of their eyes is chosen, people may after

all come to realise that the artist is either mad or not in control. Whichever way it goes, the meaning of the memorial would be quite different from what Maya would have in mind.

Unlike traditional media where the sequence of making may not be important, computer generated drawings have a hidden structure behind it. The structure is contingent upon two factors: the programmers' signature, and how the programmer want the way you sign yours. Each computer programme have its own structure of representation which is unknown to the designer -unless you happens to know a lot about computer. The structure dictates the mode of interaction between you and what you are going to see on screen. The structuring of the computer software, which is designed by software programmers with absolutely no knowledge of the project you are supposed to do, is going to have an impact in your 'act' and your 'idea' of drawing. And eventually it will even have a mark on the 'object' of your drawing which is completely divorced from the 'social practice' of the discipline you are in.

## 5.2 The problem of Process

In the old days, that is before the Industrial revolution, artefacts are painstakingly craved by the workman and signed. Nowadays, we think that is ancient and that with the touch of a button the CAD/CAM machine will turn out thousands of the same in no time at all. To make thing more interesting, we could even compose our 'design intention' on our beloved word processor, print it and enclose it with each copy of our creation. Well, not to forget that the enclosed 'statement of design intention is computer produced and requires no signature'!<sup>12</sup>

In the old days, in the 17th centuries, it is part of the required 'module' for learned gentlemen to go on a Grand Tour. They observe, measure, sketch, paint, copy and even steal in the hope of bringing home a piece of the foreign culture. Nowadays nobody go on holiday with their easel, paint brushes and canvas. If you do that people might have a different opinion on you. Instead we all have cameras and we take pictures. It is becoming so easy.

In the old days, say 15 to 20 years ago, one used to draw and letter. Now one compute. One compute plans, sections, elevations and most important of all the beloved perspectives. And when computer is becoming fast enough one can even compute images, reality and being and, some AI enthusiasts would like to see, thoughts. It is becoming so handy that we are beginning to lose the ability to process drawings.

## 5.3 The problem of Perception

Ian Richtie, an English architect and one of the early adapter of computer aided design in his office, admitted that he seldom shows a computer generated drawing to his client.<sup>13</sup> When asked why, he simply answered that no matter how well they are done, they do not seems to look right, somehow something is very wrong about them. When pressed, he revealed that there is a problem in the feeling of 'weight'. What Richtie experienced, which he was unable to pin down, is what Gestalt psychologists like to coin it: the illusion of form.<sup>14</sup> That is to say, there is a difference between 'real' reality as one is accustomed to and the 'depicted' reality through the use of representational media like photographs, paintings and drawings.

In perception, the eyes are searching not for geometrical form but for meaning. Or as some anthropologists would like to call it: the innate nature to seek and distinguish for the reason of survival. There is no point seeing 'a triangles and two circle and a rectangle' running towards you if you do not see it as a 'car'. Likewise, a rectangle within a rectangle can be a door, or it can just be a reveal. The interpretation of the shapes has a lot to do with our intention, and our intention in turn is conditioned by what we interpret. The two are inseparable.

Using traditional medium, an artist will select a vintage point which best capture the essence of what he is trying to express of the object. He will draw it insuch a way that a thicker line on one side denotes light shinning from the other side. The darker tone at the bottom denotes the mass of the object. The wobbly line on top denotes the level of workmanship achieved. And its position as related to other objects denotes its exclusiveness. In short, the drawing is a container of meanings beyond the object itself. What happens when the object has to be drawn from the other side. Does it means that the thicker 'line' on the right should be flipped to the left? Does it means that the other objects behind should now be drawn in front? What kind of message is this new drawing going to give?<sup>15</sup>

If drawing is a truthful representation according to the laws of perception and drafting is a truthful representation according to the laws of physics, then one can say that it is the skill of the artist to realise the differences and through 'twisting' and 'augmenting' reality he achieves reality which is perceived to be real.

## 6.0 Active Studio 1.6 beta

The problem of structure, process and perception as delineated above are just some of the main problems facing architects when executing their design ideas using CAD. In brief, the problem of structure detaches the historical process of drawing from the architect's drawing process. The problem of process detaches the selection of the appropriate medium from the drawing process. And the problem of perception detaches the meticulous process of applying techniques from the drawing process. The problems are not insurmountable. Indeed, the cause of the problem is in most instances ignorance, carelessness and oversight. While much of the responsibility lies with the designer, as teacher, how the tools are taught in class may also have some bearing as to how they are subsequently perceived in use.<sup>16</sup>

Active Studio 1.6 beta<sup>17</sup> (beta to denote the on-going nature of the current investigation) is a series of studio experiments to see ways where the problems of using CAD in architectural design could be addressed. It is unlike most CAD studio in that it is not software, tool, model or even design based. Instead, the studio emphasises on inculcating a sense of critical faculty in the application of computer aided drawing tools in the representation or envisioning process of the design. In order to develop the skill required to 'see through' a drawing, a learning schema as depicted in Figure 4 is used.

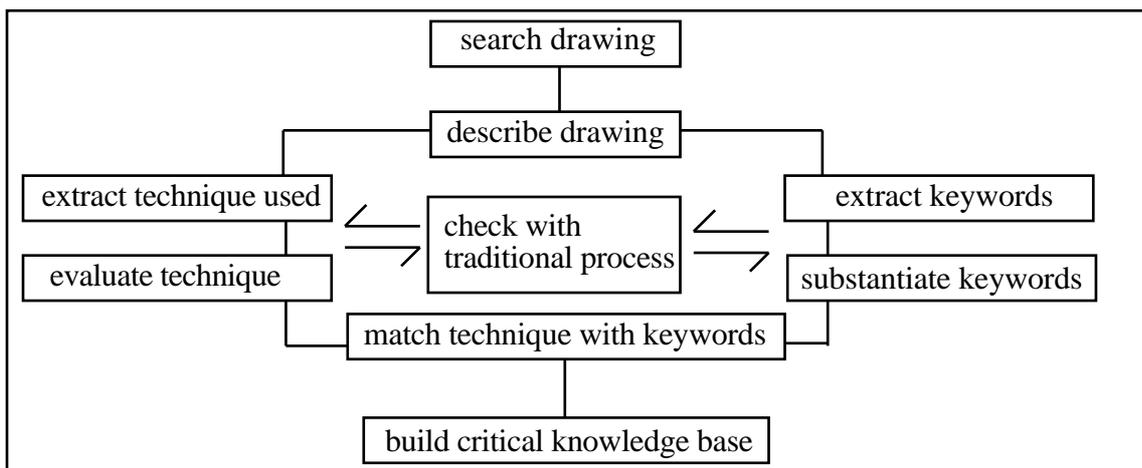


Figure 4 The learning schema in the ActiveStudio

The schema forms the basis of a database whereby the images and their critical keywords and could be constructed and later on accessed. The idea is to enable inexperienced designers to retrieve examples of images and the techniques employed by using keywords like 'to communicate', 'to feel' or 'to mystify'. Realising that the use of a certain medium and technique has a 'it depends' factor and that even a slight twist and seemingly minor changes to a drawing could have given it another meaning, the database is not meant to be definitive. Instead, it serves as a guide to direct the eyes to see potentials and possibilities.

Apart from feeding in the images by researchers and their experimental subjects, the database has an active update function. This is necessary as the database would otherwise be restricted in semantics by the research team. Basically, after each session, the enquirer would be presented with 10 or so images from the database and be prompted to respond whether or not the images could also be used to describe the same keyword or technique the enquirer used earlier on. The presentation of images is entirely random as the researchers do not wish to impose any interpretation to the structuring of the presentation.

The database is designed to work in tandem with the routine task of CAD drawing. At present a

Mac version developed using Hypercard is available. However, as the database grows, a more proprietary system would have to be designed. Ultimately, the research team hopes to make it available on the web.

## 7.0 Conclusion

With the proliferation of computer generated graphics in the design studio nowadays, it is increasingly of importance to ensure that we do not try to train a generation of architects who are wonderful in creating virtual worlds or to replicate the real world and yet at the same time fail to communicate the being and the essence of their design in a critical and responsible manner. In this respect an understanding of the role of drawing both in terms of representation and in vision would help to foster a sense of system and 'reality' in the growing realm of designing in cyberspace. No longer are architects and clients now willing to accept the surreal fly-by and flip book perspectives without posing difficult questions like: 'it is nice, but does the building really look like that', or 'fascinating, but what are you trying to tell me'. The system as developed is not to be perceived as a hindrance to design freedom, but an accumulating ground for new possibilities. Computer generated drawing has yet to be accepted as a serious replacement of traditional medium, but if we, as researchers and teachers are serious enough, we may see that one day we could "... Remember a time ... When every artist thought he owed it to himself to turn his back on the Eiffel Tower, as a protest against the architectural blasphemy with which it filled the sky ..." and could say with confidence that "... The discovery and rehabilitation of ... Machines soon generated propositions which evaded all tradition, above all, a mobile, extra human plasticity which was absolutely new ..." <sup>18</sup>

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<sup>2</sup> Robin Evans, 'Architectural Projection', *Architecture and its Image*, Centre Canadian d'Architecture, 1989.

<sup>3</sup> Gerhard von Bruggen, *An Introduction to the General Art of Drawing*, 1684. Cited in Lambert, S., *Reading Drawings: An Introduction to Looking at Drawings*, Pantheon Books, New York, 1984, p9.

<sup>4</sup> Some of the more recent and better publications on the subject are: Edward Robbins, *Why Architects Draw*, MIT Press, 1994; Kenneth Frampton, *Sketching: Alvaro Siza's notes*, Lotus 68: pp73-87; Jan Hochstim, *The Paintings and Sketches of Louis I. Kahn*, Rizzoli International Publications, Inc., 1991; Bruce Brooks Pfeiffer, *Frank Lloyd Wright Drawings: Masterworks from the Frank Lloyd Wright Archives*, Harry N. Abrams, Inc., 1990; Vincent Scully, *Marvelous Fountainheads. Louis I. Kahn: Travel Drawings*, Lotus 68, pp 49-63; Iain Fraser & Rod Henmi, *Envisioning Architecture - An analysis of drawing*, Van Nostrand Reinhold, 1994.

<sup>5</sup> Robbins, E., *Why Architects Draw*, MIT Press, 1994, pp58-78.

<sup>6</sup> The list is a result of examining over 30 texts on studies in drawing and architects talking about

drawing. The list is not exhaustive.

<sup>7</sup> Robbins, E., *Why Architects Draw*, MIT Press, 1994, p7.

<sup>8</sup> Eisenstein, E., *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early Modern Europe*, Cambridge University Press, Cambridge, 1979, vol 1, p 24.

<sup>9</sup> McCullough, Malcolm, *On visualisation*, *Computer Graphics World*, vol 16, no 7, July, 1993.

<sup>10</sup> The author has argued in another occasion of the risks posted by the up-coming of cyberspace and cyber-architecture on the destruction of architectural vigour. See Ng, E., 'Enriching the language of graphic representation in CAAD', invited key-note paper, 1st International Congress on Graphics Engineering for Arts and Technical Drawing, Florianópolis Santa Catarina, Brazil, 1996.

<sup>11</sup> Surggs, J.C., Swerdlow, J.L., *To Heal a Nation: The Vietnam Veterans Memorial*, New York, 1985, pp78-79.

<sup>12</sup> In the last year or so, the author has received an increasing number of letters which have the statement 'no signature is required' on them.

<sup>13</sup> Lawson, B., *Design in mind*, Butterworth-Heinemann, 1994, p90.

<sup>14</sup> Vernon, M.D., *The Psychology of Perception*, Penguin Books, 1962.

<sup>15</sup> Paul Richens of Cambridge University has done a lot of research into this area of representation. See Richens, P., *Does knowledge really help? CAD research at the Martin Centre, Knowledge Based Computer Aided Architectural Design*, Carrara, G. & Kalay, Y.E. editors, Elsevier Science B.V., 1994, pp305-326.

<sup>16</sup> The author has previously researched into the pedagogical style of CAD teaching in architectural schools. See Ng, E. & Mallard, M., *Active Studio 1.0*, eCAADe Conference Proceedings, 1993.

<sup>17</sup> See Ng, E. & Mallard, M., *Active Studio 1.0*, eCAADe Conference Proceedings, 1993. See also Ng, E. & Mori, S., *ActiveStudio 1.1*, eCAADe Conference Proceedings, 1994.

<sup>18</sup> Hardison, O.B. jr., *Disappearing through the skylight -culture and technology in the 20th century*, Penguin Books, 1989, p144.

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