

Changing Roles for (Multi)Media Tools in Design

Assessing Developments and Applications of (Multi)Media Techniques in Design Education, Practice and Research

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This contribution explores the continued evolvement of the instruments of design in relation to practice and education (and potentially: research) and attempts to characterize the effects brought about by recent media 'shifts'. For this purpose a framework has been established to identify and 'map' relevant design media. The relationships between various 'traditional' media and computer based applications are scrutinized and characterized and the opportunities which they offer are compared. The underlying conceptual framework was recently put before a group of professionals in the in the course of an experimental workshop concerning the potentials of a virtual design media 'museum'. In the following step an attempt is made to identify changing media roles, whereby the opportunities of the educational environment – as a 'laboratory' for emerging developments – is stressed. Some specific tendencies are identified, notably: the combined application of different sorts of design media; the surfacing of imaginative new working methods inspired by 'classic' media techniques and various new ways of escaping the serious limitations of traditional computer interfaces. These developments, making use of various types of computer platforms, may be expected to contribute to more structured – and imaginative – approaches to professional design as well as to architectural education and research.

Keywords: *Computer support for learning; The changing role of the design studio; Educational Methodologies*

Introduction

Designing – as a form of intellectual enquiry and structural development – is an activity which is to a great extent dependent on processes of (inter)active

imaging. The evolvement of a design concept from relatively 'vague' preliminary design proposal towards a 'concretized' spatial and material object

or environment generally follows an uncertain path through largely uncharted terrain; a journey of exploration which requires both rational and creative consideration. Such designing involves frequent collaborative interchanges of information: within the primary design team, but also with (the representatives of) different contributing disciplines.

Designs are conceived, developed and refined step by step (generally speaking from 'rough to fine') in iterative design 'loops' (Zeissel, 1984). All the while, the designer is busy determining which 'course' should be taken. This is done via Designerly Enquiry (Archer, 1981), by considering reference material, by reflecting on conceptions developed previously and by generating specific options which fuel the kinds of decisions that determine the end product. In the course of such a trajectory, all sorts of visual information is continually being developed, selected, tested, and subsequently either discarded or developed further.

From early times designers have been considered not only as 'experts', knowledgeable in their specific discipline as a craft, but also as 'creative directors' of such development processes. The designer must be capable of conjuring up visions of the future spatial and material form of the design and of conveying these to the other 'actors' involved in the initiation and realisation processes. Such 'sharing' of information is necessary in order to generate sufficient understanding, consensus, enthusiasm and: means. For a design to become more than just a 'figment of the imagination', the designer's ideas need to be 'pinned down' (even when the thinking process is not yet entirely finished), by using a reliable, readable (or combination of media).

As such it is not entirely exaggerated to state that in design driven studies „the Medium is the Method“ (Breen, 2000).

Identifying media levels

Design education involves the attainment of relevant knowledge concerning characteristic issues and

insights into the effects of choices. In conjunction with this, the future designer needs to master and exercise skills, by which design concepts can be documented and communicated.

The most prominent form of notation was (and arguably still is) the drawing. For generations students of design have become acquainted with different types of drawings, such as: plans; sections; elevations; isometric projections; perspectives – from explorative freehand sketches to precisely measured, technical drawings.

However, designers have not relied solely on drawings. They have proved inventive in developing or adapting a wide range of other design 'instruments' for their aims, such as: models (both physical and conceptual); schemes; diagrams; collages; photo-montages; video productions; employing various codes, symbols and legends.

In recent years, the scope of design media has expanded enormously through the introduction of computer based platforms. The computer – as a piece of hardware – should not to be considered as 'a' medium for design enquiry, but rather as a framework which can house several different types of instruments. Whereas digital drafting may have initially attracted most attention, in recent years various forms of virtual modelling and image manipulation have greatly expanded the creative 'palette' of the contemporary designer.

Interestingly, the introduction of such tools has led to more personal and varied working methods, whereby active use can be made of different combinations of digital techniques.

Familiar physical media have not altogether been replaced by computerised design media, as was predicted by many 'experts' a number of years ago, though it is undoubtedly true that computer driven media have taken over the role of certain techniques, such as that of traditional technical drawing. However, 'tangible' design media, such as sketching and physical modelling, still play an important role; in design education as well as in practice. One of the most interesting developments that have

become evident in recent years is the increasing tendency towards working with different sorts of media – in conjunction – digital as well as physical. Trend-setting designers – but also students – freely mix their tools, which have thereby become truly interactive media...

Mapping media

In order to gain more clarity concerning the different kinds of design oriented media and their relationships, an attempt was made to ‘map’ media applications and their characteristics.

Several configurations were considered and tested. Eventually a system was devised, with four ‘cornerstones’ identified and positioned within a grid structure, whereby the elementary ‘types’ of design media could be grouped relative to each other. The basic format: a square divided into nine identical fields, in a 3 X 3 grid organization.

Per layer, media applications were ‘positioned’. Each of the four levels in turn can be imagined as a circle segment within a square, with one of the four central conceptions as its own (‘active’) cornerstone. On each layer a cluster of ‘tools’ is specified

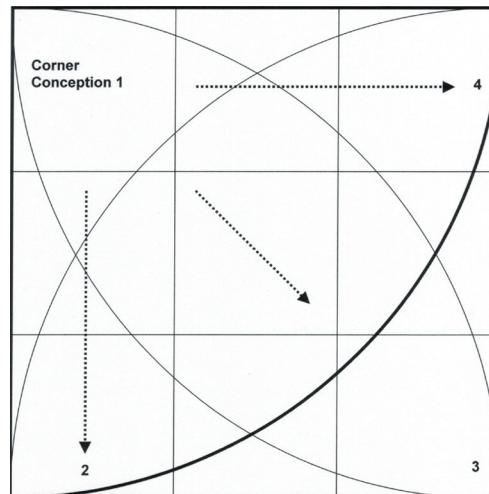
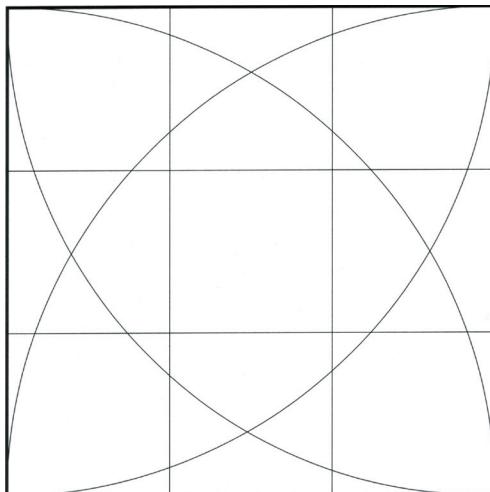
and positioned in relation to the other three ‘corner conceptions’.

On such a layer the ‘active’ corner conception is identified and five of the remaining eight fields are defined in relation to the other three corner conceptions. To each of these a number of specific applications is ‘attached’.

In principle – if the system were to be used as a database – each of these fields could house a ‘collection’ of exemplary design media artifacts in order to illustrate the qualities of specific tools and their potentials. As such an ensemble of layers might acquire the function of a kind of Media ‘reference library’... In this context it is worthwhile to consider the structure not solely as a collection of two dimensional grid ‘maps’, but potentially as a three-dimensional matrix organization, introducing the possibility of its being considered as a spatial ‘data structure’...

Four elementary media types - as instruments of design - were recognized and used to identify the four different ‘layers’: Drawing - Image - Model - Symbol.

Initially, a distinction was made between physical and computer-based modes. However, it was soon



*Scheme 1
Basic configuration.*

*Scheme 2
Principle of the organization
per Layer.*

recognized that there is no essential difference between, say: physical modeling and computer modeling. The differences are intrinsically a question of instrumentality (which naturally do influence their utilization as working methods).

Within each of the four levels, physical and digital platforms (and their modes of operation) were grouped. (see schemes 5 to 8). In the following paragraphs a brief description of the four levels and their most notable attributes is given.

Drawing

Possibly the most 'elementary' design medium to be considered would be the Drawing.

Two essential application categories would be the more or less 'technical' drafting methods on the one hand and the more representational 'presentation' drawings on the other. The main intention of – essentially two dimensional – drafting techniques is to offer non ambivalent information for other parties, such as building contractors. By contrast, representational drawings are used to convey qualitative information concerning the 'workings' of a design. For instance, effects of plasticity or materialization

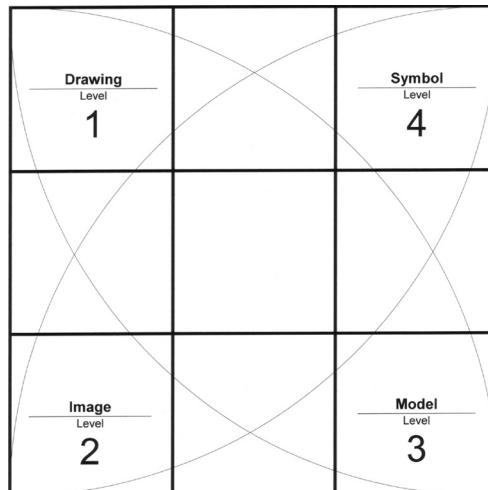
may be suggested more or less realistically, even in essentially two dimensional drawing modes.

Several types of relatively realistic 'perspective' drawings can approach – at least to some extent – the effects of the perception of a realized design. Reductions frequently need to be applied for the benefit of manageability and/or readability of the drawing. For this reason codes are often used in drawings, incorporated to exemplify some aspect of information through the use of signs, hatchings or, notably: the functional use of color.

Probably the designer's most direct 'thinking' medium, on the drawing level, would be the sketch. Frequently these are quickly (even impulsively) executed, in order to note down or probe some emerging idea. Sketches may simply be two dimensional, but are frequently (semi) 3D. A form of notation which might be appreciated as a kind of 'drawn model'.

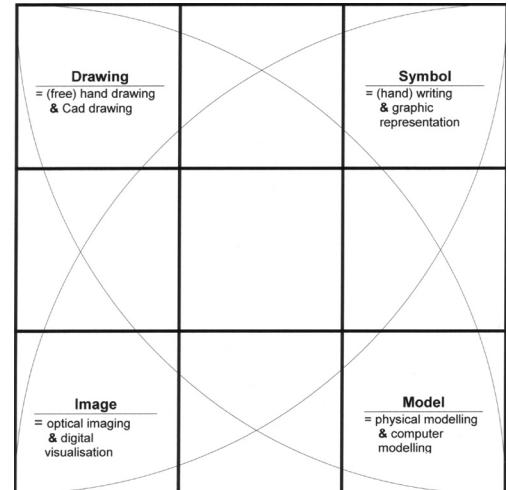
Image

Various kinds of media are used for registering, creating and manipulating true to life, 'realistic' impressions via Images.



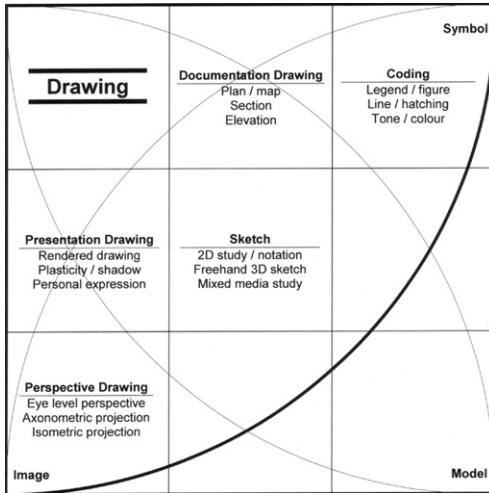
*Scheme 3
Identification of four elementary levels.*

*Scheme 4
Physical and Digital approaches.*

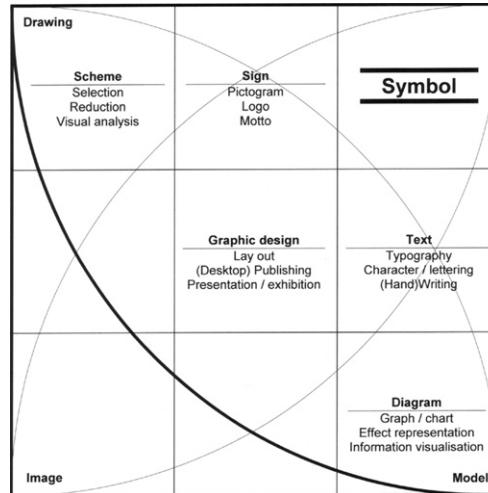


Two frequently used applications may be identified under the – more or less traditional – headings of photography and film. Designers use photographic images extensively, either for registration, reference or inspiration. Similarly, dynamic visual registrations have been used in relation to designing for quite some time, mainly as a means of documenting the

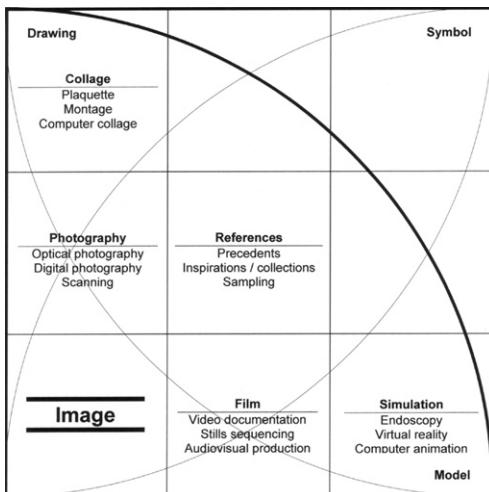
existing conditions which are to be altered. The introduction of digitized imaging platforms has in recent years contributed to an marked growth in imaging activity, particularly through the manipulation and combination of available images. Developments in this field have also given rise to several innovative multimedia approaches.



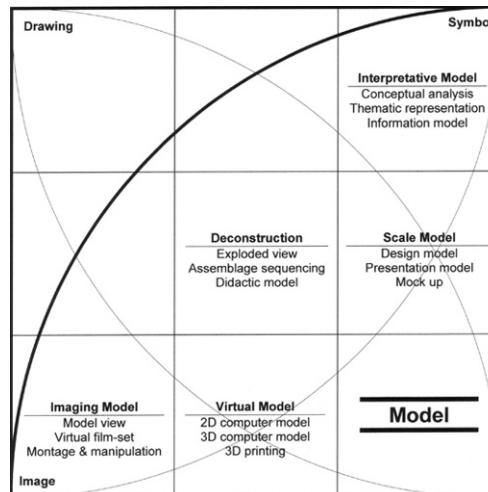
Scheme 5
MEDIA Overview 1: DRAWING layer.



Scheme 6
MEDIA Overview 2: IMAGE layer.



Scheme 7
MEDIA Overview 3: MODEL layer.



Scheme 8
MEDIA Overview 4: SYMBOL layer.

A particular branch of 'imaging' has been involved with simulation, generally in order to visualize the effects of design interventions. Initially, this primarily involved acquiring images from physical models, however increasingly use is made of 'virtual' modeling platforms. An alternative imaging opportunity, favored by numerous designers, is the collage or image montage. In such working methods 'ready made' elements are (re)combined to make a visual ensemble. The use of reference collections of visual data has grown steadily in recent years, largely due to the opportunities of sampling and transforming digitally defined images from sources such as the internet.

Model

Whereas drawings and images tend to be used to depict (specific or combined aspects of) a spatial composition, active Modeling offers an opportunity to explore the attributes of a design in three dimensions.

Traditionally, design models have been physical interpretations of the design, usually worked out on a reduced scale and level of complexity. Making such a model is in many ways comparable to a small building process. Such a 'tactile' approach tends to lead to insights which are not always acquired as directly using other media. In some cases, parts of a design (sometimes even a whole prototype) are realized and tested scale 1 to 1. Computer models are in principle also worked out in a 'real size' – digital – environment. However, these need to be accessed via computer interfaces with implicit restrictions. Models do not necessarily have to be more or less direct representations of a spatial design. Interpretative models may be used to probe and explain more abstract design issues, such as the formal, conceptual and thematic attributes of a design concept.

In all of these approaches, the scala of information concerning a design is consciously filtered and specific attributes are highlighted. A particularly

rewarding modeling approach involves a form of deconstruction (frequently coupled to a process of visual re-construction) in order to shed a light on aspects such as structural assemblage and building sequence, or to offer insights into the design's organizational and operational aspects.

Symbol

Although the designer's proposals tend to be conveyed using combinations of drawings, models and images, this information is generally enhanced by using different kinds of Symbols.

The first aspect of symbolic representation to spring to mind might be the use of text, whereby the textual 'tools', such as lettering and (hand)writing modes figure prominently. In addition, use is frequently made of 'signature' signs, such as logo's which depict some meaning in a graphically stylized way. Two prominent 'symbolic' forms of representation in design practice and education are Schemes and Diagrams. Although these are sometimes considered as being similar, the following distinction is made here: a design scheme is a selective, often reduced, representation of some aspect (or combination of aspects) of a design, such as a stylized cross section to depict the effect of natural lighting in a building, whereas a diagram is an instrument to interpret some information (concerning a design) in a visually readable way, such as a graph or chart. The influx of computer platforms has led to new ways of, layered, schematization and wholly new ways of representing coded data in (3D) diagrammatic form.

The introduction of computers has given rise to new design related applications for graphic design modes and particularly for the combination of different kinds of visual information via presentations and exhibitions.

Collections and combinations

It is hoped that the above media structure might be considered useful as a Typology (or possibly: as a

Taxonomy) for design based modes of expression and enquiry. In this sense the system has been put forward in order to offer insights concerning the kinds of media which are available to the designer and to give an impression of the sorts of results using such media might offer. Confrontations with students (first year as well as diploma phase participants) and groups of professionals have indicated that the system has the potential of creating clarity concerning media. This system is by no means a static 'end product'. A recent workshop at the 2003 EAEA conference has led to a number of refinements included in the version presented here. As such suggestions for change and/or expansion from media experts are welcomed.

In this context, there is a potential worth considering and exploring. This would involve developing the system further as a kind of a virtual 'construction'. This might house a collection of design media artifacts. An on-line 'museum space' for the benefit of an interested public (specifically from the fields of education and practice), through which visitors might be able to navigate freely, referring to exemplary 'pieces', which might be contributed by various institutions as well as by individual design practitioners and students for the benefit of information and inspiration...

What kind of (virtual) form might such a Virtual Media Museum take? Should it resemble a simple 3D cube, consisting of four 'department' layers? Or would there be other opportunities which would make visiting this 'Center for Media' a perceptually interesting occasion? If so, how ought the – Drawing – Image – Model – Symbol – levels be placed relative to each other? How should the complex be 'entered', should there be some form of communal (information) space? How would one move from place to place and then retrieve, view and study artifacts belonging to the collection, whilst creating links to other relevant examples?

These questions were put before groups of participants in a special EAEA Virtual Media Museum workshop during the 2003 conference in Bratislava,

Slovakia. The proposals which came out of this brief workshop were varied. One surprising concept which was put forward by a group led by Japanese professor Ryuzo Ohno suggested an 'entrance level' housing the Symbol collection, with the Image department in the cellar and a spiraling ascent through the Drawing level towards the uppermost Model level...

In the previous examples the media applications have been identified as 'singular' items. However, it is clear that certain techniques may involve working with different applications simultaneously. A sketch might become a logo, a scheme be made by applying color in a digital photograph, a model be the centerpiece of an exhibition, a sampled image be inserted into a 3D model view etc.

Clearly modern design media can borrow and combine different applications which in the past would be seen as separate 'skills'. In this light is worthwhile to consider the changing role of – digital – media in design education.

Changing roles for digital media

Originally, computers were heralded as a 'new' medium. In the eyes of many 'true believers' here was the revolutionary instrument which would change just about anything and would inescapably replace all the other 'messy' physical media. It seems fair to say that computers have radically changed the working methods of – amongst others – architectural designers, however the role played by 'the computer' in design has in many ways taken different turns than was foreseen and the media developments hardly appear to have come to a standstill. It may be argued that the computer still largely consists of one piece of hardware, but that on the media level it has become a platform for various media, many of which can be used in combination.

Some observations on the changing roles of digital media in the 'multimedia age'...

Computer dominance?

Whereas digital drafting may have initially attracted most attention, in recent years various forms of virtual modeling and image manipulation have greatly expanded the creative 'palette' of the contemporary designer. Interestingly, the introduction of such tools has led to more personalized and varied working methods, whereby active use can be made of different combinations of digital techniques. Familiar physical media have not been wiped away by computerized design media, as was predicted by many 'experts' some years ago. Although it is undoubtedly true that computer driven media have taken over the role of certain techniques, such that of as traditional technical drawing, proven design media, such as sketching and physical modeling, still play an important role; in design education as well as in practice. In fact in recent years we witness a renaissance of 'traditional' modes of representation, also often in combination with computer-based means of expression...

In this context one of the most interesting things to has become evident in recent years is that there appears to be an increasing tendency towards mixing different sorts of media in conjunction, digital as well as physical. Trend-setting designers – but also students of architecture - freely mix their tools, which have thereby become truly interactive media...

Computer platforms have become the undisputed 'carriers' of this wide variety of imaging artifacts. The computer, not as the replacement of 'classic' media, but the intrinsic, shared factor for imaginative new multimedia applications.

From new output modes to new multimedia techniques

One of the notable developments which we have witnessed in recent years is the way in which new forms of output have given incentives to media applications. These ways of getting digital information 'out of the interface' might be characterized as the „Three P's“: Projecting – Printing – Producing.

The introduction of beamers with a decent resolu-

tion, but particularly: sufficient brightness (and relatively modest costs) has triggered a focused activity whereby the eventual projection has become a determining factor in design presentations. This emphasis on output gained momentum with the introduction of PowerPoint and comparable platforms and became aesthetically interesting largely due to by design students, which were subsequently adopted by professionals.

Similarly, the opportunities for high quality printing have led to a way of getting information 'out of the computer'. Again the educational environment has been responsible for the acceleration of this development, whereby booklets and posters of professional graphic quality and high resolution have become the norm. These productions are often collage-like compositions, combining artifacts from different media, sometimes resulting in a dizzying mix of visual information, bordering on 'overkill'. Designers – particularly students – need to learn to 'tame' their information, given the almost borderless opportunities.

In the wake of this development other forms of – three dimensional – production on the basis of digital information is beginning to gain prominence. One example of this development is offered by the domain of rapid prototyping, leading to the 3D printing of spatial compositions from digital files (Stellingwerff et al, 2004). Another way of giving computer based methods a role towards effective physical modeling are techniques such as computer aided milling and laser-cutting.

Sequencing and dynamic presentation

In the last decade a great deal was expected from internet-based design activity and information exchange. Several collaborative projects have led to some truly interesting processes and results. A negative point in some cases has been the relative lack of 'personal' consultation and constructive criticism, which is arguably one of the most essential aspects of a rewarding educational undertaking.

One of the most prominent effects of the internet

is the ease of 'finding' information. Fact is that students are able to come up with collages of images which serve as inspirations or as reference material concerning their individual ambitions. Some would argue that we are beginning to be overwhelmed by an uncontrollable 'Information Sprawl' and that the ease of coming up with an impressive quantity of reference imagery has diminished the act of intelligent searching and ... discovering.

This imaging trend has also been stimulated by the recent influx of optical devices using digital data platforms. Whereas the exchange of information from one format to another used to be cumbersome, specialized work, nowadays the input and manipulation of (digitized) visual information is no longer the domain of specialists. In an educational setting the availability of editing software has given rise to dynamic montage approaches, besides as 'film', frequently as sequences of essentially 'still' information, or in combination. Characteristic is the mixing of video, photography, drawings, sketches and various models with text, sounds and music. The designer as 'presentation director'?

Digital sketching at last?

A distinct ambition of design researchers and educators has for many years been to get the computer involved in the 'idea phase', 'upstream', in short: to become a fundamental design instrument, not just a means of documenting ideas made previously using 'traditional' media.

One might argue that this is not an important goal, that designing does not just involve the 'early sketch phase', that design is a step by step process whereby different media have their place in different phases of the lengthy process of design. Nonetheless, computer experts have been trying for years to give the computer a worthy role as a sketching tool...

In part this has already been achieved by the 'proven' computer based instruments such as Computer Aided Drafting and Computer Aided Modelling.

Many designers work directly in computer drawing modes, making use of the opportunities of systematically bringing in alterations and the abilities of working in different levels. Negative point in this context are often the need for precision too early on and the lack of overview in drawings. These tend to acquire a status of their own and thereby the designer – particularly the student – may lose track of the spatial connotations of design decisions in the maze of information 'behind' the screen interface.

Computer Aided Modeling with 3D software (such as 3Dstudio and Maya) is also frequently used in the idea phases of design and many design students are extremely skilled in conjuring up seductive conceptual images in the primary stages of design. Although this may lead to worthwhile design proposals, there is also a negative side to this development: a fixation on image rather than on content and a tendency to be 'blinded' by the seeming definiteness of relatively unstructured proposals...

In the wake of these, relatively 'heavy', applications we are now confronted by 'playful' new 3D 'sketch' software (such as SketchUp). These applications may play a serious role in the 'idea' phase, but may also be of considerable benefit for analysis and research. The interesting thing is that such approaches do not try to 'mimic' traditional sketching via a computer interface, but introduce a new kind of sketching, as a logical progression from existing computer modeling techniques. Such approaches may presently still be interesting as 'extra's' for designers skilled in 'classic' computer modeling. However, once a new generation begins working with such application from the start of their design education – or even before they start their official learning – the palette of designers and researchers may once again be extended considerably.

One of the interesting aspects of such 'new sketching' developments may be that these instruments will prove to be particularly effective in the context of Design Driven Research (Breen, 2002). Studies making use of multimedia platforms, may be expected to contribute to more structured – as well

as imaginative – approaches to professional design as well as to architectural education and research. Such ‘sketch’ approaches could prove particularly attractive to educators and researchers, who have lost track of the more specialized digital media applications and want to ‘get back in’...

The educational environment as a multimedia laboratory

In this paper a system has been described which was developed in order to ‘map’ the variety of contemporary design and (re)presentation media. In addition, an attempt was made to analyze changing media conventions in design education, practice and potentially: in research. Notably, the evolvement of interdisciplinary multi media approaches in design education has been considered, on the basis of some ten years of experience with an (architectural) design presentation module (Breen & Giró, 2003). New potentials for multimedia tools – as design ‘instruments’ – may be expected to extend the creative palette of designers on the levels of inspiration and information... In this context, the role of the educational environment as a laboratory for new design media applications should not be underestimated. On the contrary, as a learning environment for designers – who should be equipped to address the questions of the future – design education is a testing ground for the new instruments of design driven enquiry, but also the primary platform for the continued development of innovative working methods and the instruments of design.

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