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National College of Art and Design
Faculty of Design Visual Communications

Graphic Design in the Digital Age

by
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With thanks to Emer Williams

c o n t e n t s

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In this thesis I will try to question and explain the nature and evolution of the computer within the graphic design industry, bring up the pros and cons of its usage while examining its impact on the creation and production of design. In the opening chapter will follow the development of design from the Modernist era up to the current digital age, on the way looking at the relationship between social thinking and its influence on design. The next chapter tracks the early development of computer as a emerging creative tool, focusing on the experimental work of April Grieman. Chapter 3 then looks at the origins of Deconstruction and how it relates to graphic design then – how its concepts are applied within the design movement. Finally closing with a look at the developments of new media, defining its role in the potral of information.

The Modern movement in design was born as a rebellion against the decorative excesses of Art Nouveau. Art Nouveau's ideas relating to themes from nature appeared inconsistent with the rapid industrialization that was occurring throughout Europe. The debates that pre-occupied the Victorians, that craft versus machine production and the purpose and function of design remained important. However what designers now wanted was an opportunity to meet the challenges offered by the machine age. Designers and Architects set out to create a new aesthetic for the 20th century. They believed in the city and a secure future made possible by the new inventions and progress of the machine age.

The key features of Modernism was the ideas of rationalism, order and an embracing of functional simplicity. The slogan 'form follows function' reflects these ideas of the modernistic approach to design. The designers involved explored the belief that mass production led inevitably to pure geometric form, and therefore rejected decoration. Other slogans of the modernists that 'less is more' (Mies van der Rohe), and Le Corbusier's description of the house as 'a machine for living in' underpinned these attitudes. Graphic design was as much a part of these developments as any other area.

At the bases of the international style was the creation of a grid for all purposes, a concentration on sans serif faces and asymmetric layouts. The Swiss designers whose work shaped the international style reduced graphic design and typographic content to simple, repeated forms. This was seen as a way of producing a clarity in communications without the traditional clutter of unnecessary shapes.

The idea of some form of grid underlining layout was not new, and had been seen in work well before this time. But what was new was the introduction of a squared grid which was drawn up in relation to the contents. By splitting the page or poster into a grid, a series of modules was arrived at. This could then be used to articulate the different design elements on a page.

A new demand grew for the creation of sans serif faces. Designers did not favour the pure geometric nature of futura or the post-Bauhaus faces but the 1896 Berhold face Akzidenz Grotesk. It was a modern gothic typeface with squared, contrasting strokes and favoured for its ability to provide a more comfortable close fit of letters. Its widespread interest lead Max Miedinger to be commissioned to refine it where it was latter re-launched as Helvetica. Its success lay in offering a comprehensive family that fitted the taste of the time as well as its raw functional qualities which were in demand at the time.

These were the qualities of the other great typeface of the period, Univers. Designed by Adrian Frutiger in 1957, it was an attempt to deliver an integrated family that took the desire for a modern, lightly stressed sans serif and produce it in a range of twenty-one variants. Univers came with a labelling system that tried to revolutionise type description. It abandoned such terms as 'condensed' or 'light' and replaced them with numbers.

Since the 1970s the term Post-Modernism has been used to describe changes in

1890

Dear Sir,
I have the honor to acknowledge the receipt of your letter of the 10th inst. in relation to the above matter. I am sorry to hear that you are not satisfied with the results of the examination. I have been very careful to see that all the necessary precautions were taken, and I am confident that the results are correct. I am sure that you will find the results to be satisfactory.

I have been very careful to see that all the necessary precautions were taken, and I am confident that the results are correct. I am sure that you will find the results to be satisfactory. I have been very careful to see that all the necessary precautions were taken, and I am confident that the results are correct. I am sure that you will find the results to be satisfactory.

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design and culture. It was applied to the work of architects and designers who were breaking from the International style that had dominated architecture and design since the Bauhaus era. The term had been used before in the 1940s, then re-emerging in the 1960s to describe the new attitudes of Pop design. However it was in the 1970s that a general feeling developed that the modern era was drawing to a close. The new social and economic environment caused many to feel that the modern aesthetic was no longer relevant to what was becoming a post-industrial society.

Post-modernism can be seen as an important transition in 20th century thinking. The modern movement a response to the machine age of the early 20th century, with the Post-modernism a response to the late 20th century age of computer technology. The new developments of technological and social concerns erging designers to create new forms to express their needs and feelings.

Graphic design now reflected this new freedom. The heavy influence of the fixed and purist rules of Swiss typography began to change. Designers now began to mix typefaces and play around with print conventions and the use of imagery in ways that was not seen before. The new typography of the 1970s used the modernist typefaces such as Futura, Helvetica and Univers. It was the application of the type that was different not the design of the faces. However the digital revolution spurred on the production of countless new fonts. At the forefront of this was Emigre magazine, founded by Rudy Vanderlans and Zuzana Licko. They produced not only a magazine but a new range of fonts for use on the computer. It became an international fan magazine devoted to experimental design and typography.

The typefaces for the early computer were developed to accommodate the course, low-resolution forms and reduced range of curves and angles permitted by early laser printers. Licko's early typefaces of the bitmap stage therefore lead to forms similar of the 1920s Bauhaus design with geometrically constructed letterforms. At the Bauhaus designers such as Herbert Bayer assembled letterforms out of restricted ranges of geometric shapes. These designs emulated the methods of mass production. Licko built the Variex family of typefaces, around simple geometric forms which systematically expands to produce bolder weights. It was later when postscript fonts evolved that more control of type's outlines became available. So the limitations of the early computer systems lead to the re-examination of these older styles.

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Computers as Tools

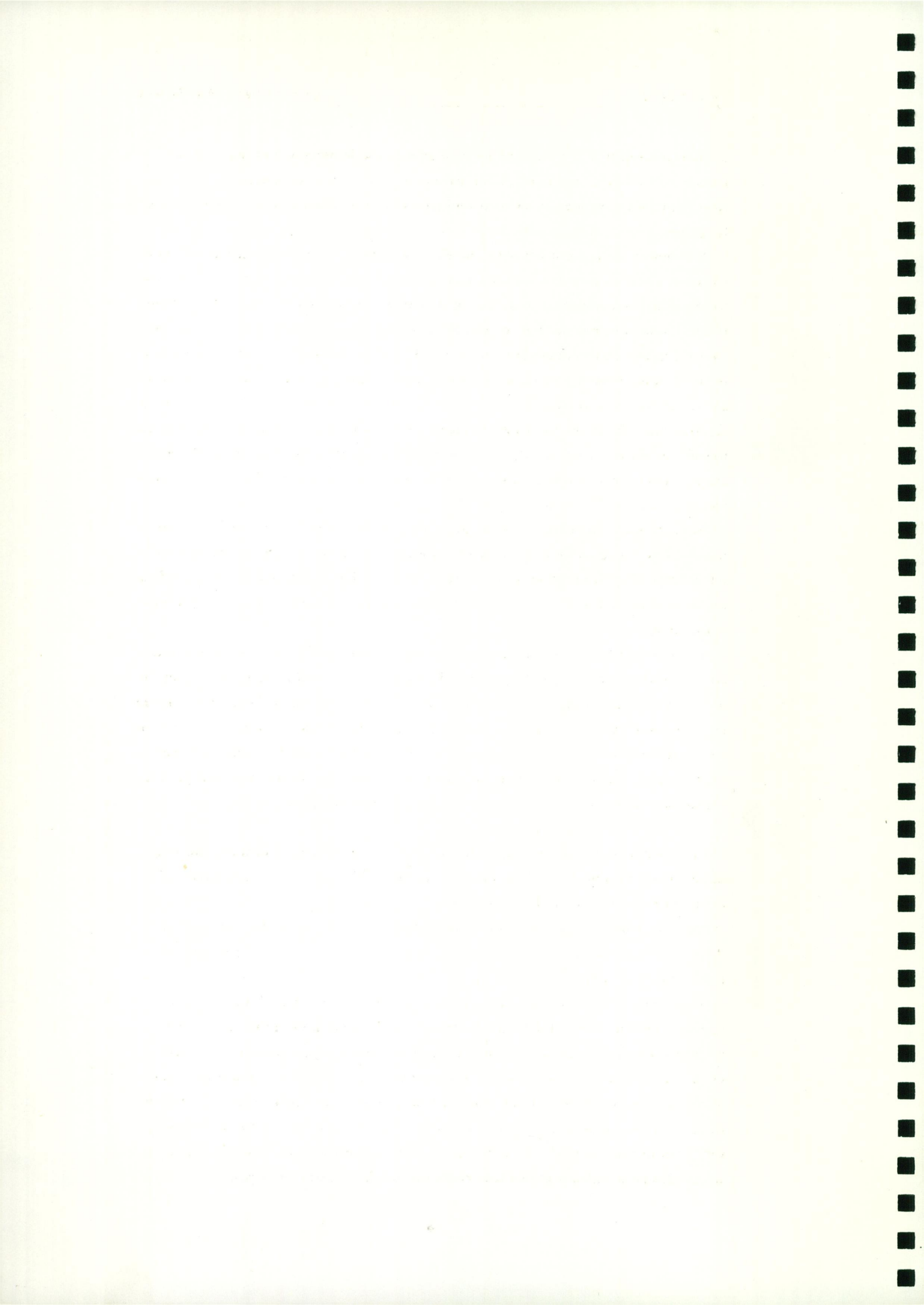
I The computer is not just one singular object, but a collection of separate devices integrated together to become what we know as the PC. The interface devices are mouse, keyboard which we use to communicate with the computer, the CPU which processes, reads and stores data information and the screen which translates this information into a visual form we can understand. These are known as the hardware. Then there are all the external add-ons of scanners, printers and storage devices enhancing the capabilities of what the computer can do. The computer is itself a hybrid form of other technologies and systems. The keyboard originates from the typewriter, the monitor from television, the processor from previous equipment and storage devices like the CD from the music world. So what is new is the way that they are integrated together using the digital language as the bases of communication between them.

The bases of the digital environment lies in the form of bits of code using merely two digits 1 and 0, thus the name digital. These act like switches and can be on or off. With a set of 8 spaces which can be on or off translate to a possible 256 different combinations. 00000000, 00101001 or 10111011 *ect.* This is known as 8-bit. Equally using higher sets of numbers 16 bit, 24 bit, so on leads to higher number of possible combinations. This can be seen in most software programmes where you are given options of for making adjustments, given the settings from 0-255. This can then relate to a pixel on the screen which could be turned on or off. It is using this system that all digital technology is based. The fact that under the complexity of the computer lies a very simple structure and method of describing text, images or sound, known as binary code. This is like its DNA structure where a small bases of numbers can lead to huge complexity in describing different forms. With the computer the very nature of the medium is in the digital format. This means that any medium used within its environment is subjected to its characteristics.

The Apple Macintosh launched in 1984, was distinguished by the user friendly approach of its graphical interface. Now the personal computer became a device capable of revolutionising the design and production of graphics. Apple concealed the complexities of the computers operating language, instead presented the user with a screen based metaphor of the desktop. This enabled non computer literate people access to the computers power and control.

In this environment items could be moved around, placed in folders and even deleted by throwing in a bin icon. These tasks can all be done using a mouse controller device, which relates to the movements of a pointer on the screen. Unlike computers of the past which required complex series of instructions, here a piece of work appeared on screen in a simulation of how it would appear when printed.

A development that had a major impact on computer design was the introduction of PostScript. It is a page description language developed by Adobe, which describes the material of an electronic page - the text, images and other graphic layout information. Text could now be described as outlines using mathematically generated lines called bezier curves instead of small squares in the bit-map system. These curves are able to create the complex shapes with smooth outlines which are ideal for the



manipulation of type. This led to a whole digital type industry with thousands of faces being re-drawn and created. This gave designers greater freedom in the manipulation of type or any graphic elements – such as logos – which was described with this language.

Computers do not just replace some existing manual activity, but offer new ways of working. These include visual effects that had previously been very hard or impossible to produce. The computer can now emulate graphic techniques of real world tools and image production processes. Anything from paintbrushes to photographic techniques. The success of this mimicking is down to the designers knowledge of these tools. It seems contradictory that the processes of say photography with its digital equivalent of a dodge, burn tools would still be applicable in the computer, but these are familiar concepts. So the techniques, tools and the characteristic of these tools have been transferred to software for the designer to utilise. “Paint and ink need no time to dry, images can be cut and pasted with soft-edged scissors and without glue, colour balance can be corrected with infinite precision” (Labuz, 1996, p.87)

Some programmes have led to a similar look and design style as a result of the common and extensive use of them throughout the world. What the software can do has in many ways effected the style of the work produced with it. Common filters and effects can be seen in a lot of graphic work that is done and follow the fashions that are around at the time.

How much the computer determines the outcome of a design is a case of how much control of the medium that the designer has. The software will in many ways lead the user in a particular direction. However as Florian Brody notes, as the user gets more experienced they can “develop their own image language”. This she says is built up from a knowledge of what the software is good and not good at producing. This leading away from the many presets and obvious choices with the goal, like in any medium of, “forcing the software to do what you have in mind.” (F.Brody, 1994, p.)

April Greiman is a designer who was at the forefront of the use of the technology in design at this time. Using page composition technology and more traditional techniques of print production her work marries digital imagery with text in a fresh and experimental way. She draws on many elements from 50s Swiss modernism such as their use of structured layouts. However she subverts this by the layering effects she employs in her work.

Greiman saw the looseness with which the term 'Postmodernism' was used and therefore preferred the term 'hybrid imagery' as a description of her work. Greiman notes that the computer's ability to translate all conventional media into a common visual format causes the boundaries between previously separate disciplines and skills to blur. It was this aesthetic of blurring that she celebrates in her own work. In Hybrid Imagery she expands on this saying that through her work she wants to show how, “a variety of technologies may be woven together to express a common vision, a unity within diversity which is particularly contemporary”. (Greiman, 1990, p.67)

This non respect of borders can be related to the broader cultural project of the time. One of the characteristics of what Jameson calls late capitalism is a problematization of distinct categories; this is best seen in the confusion between high and low art or in the breakdown between private and public space. The figure of the cyborg (cybernetic organism) with contemporary science fiction is the most literal representation of it.

Her interest in the potential of computer design developed while teaching and directing at the California Institute of Arts from 1982 to 1984. During that time her revolutionary use of computer generated design was evident in *Design Quarterly* 133 which was produced on an Apple Macintosh computer. The issue commissioned and published by Walker Art centre of Minneapolis, focused on the work of Greiman and the computer. Given complete control of design and production by editor Midred Friedman she departed from the traditional format and produced a 2'x 6' poster that folded down to fit in a sleeve the size of a regular copy of the magazine.

Greiman's description of the project gives an idea of the working method and properties of the technology at the time. She notes the speed and agility given to the designer by the technology. "The genius of MacDraw is that you can input an image or idea and then literally stretch it on screen from a few inches to a few feet in a matter of seconds. . . You can move things around freely on the surface working at large scale or diving into actual size any time you see fit." (Greiman, 1990, p. 67)

However the production was not without problems. The ambitious scale of the project pushed the limits of the equipment. "Ultimately the speed with which the new technology encouraged me to work throw it into overload, system errors kept popping up making it impossible to print out the final image, it seems that entire days are devoted to trying to figure out how to print the monster" (Greiman, 1990, p. 68).

When the publication eventually came out, it created attention and provoked debate concerning the future role of digitized communication. The statement on its cover, "Does it make sense?", forced designers to consider the technology and the radical possibilities it offered. The image itself was obviously computerised but in no sense primitive in its multi-layered style and meaning.

Deconstruction began as a means of literary criticism, and involves the examination of texts in terms of the language and ideas of which they are composed. It builds upon and revises an earlier movement, structuralism, which was led by the linguist Ferdinand de Saussure, who sought to establish language as a science. Saussure had faulted writing for not being a transparent sign system or 'crystal goblet' for conveying speech. With deconstruction the French philosopher and critic Jacques Derrida, "has challenged this devaluation of writing, by foregrounding the typographic and rhetorical materiality of writing." (Byrne, 1990 p.117)

As the word suggests 'deconstruction' refers to the breaking down of something in order to decode its parts. It can reveal the complex layers of meaning in an image. It implies that we can analyse this and reveal its visual, cultural and linguistic meanings by applying the scientific principles derived from semiotics.

Many areas of art and design have been influenced by deconstructionist ideas, most notably architecture. However, "typographic design is probably the most logical visual extension of deconstruction because of its basis in words and text." (Byrne, 1990, p.117)

With the immense freedom available to graphic designers many of the traditional typographic conventions are questioned. Arguably the most fundamental of these is the grid, which has traditionally been regarded as primary to the organisation of visual material. Invisible lines, usually horizontal and vertical are used in an attempt to create balance, continuity and visual harmony between either different elements on a single page or between subsequent pages in a book or magazine. The grid has been used throughout the history of graphic design and their shape and complexity are up to the designer to evaluate, corresponding to the type of work that needs to be ordered in this way.

The very fundamental nature of deconstructionism seems to do away with the idea and need for the grid. This can be seen in the work of a range of designers who were in one way or another caught up with the ideas behind this thinking. In this work the elements of text and images are layered and placed around the page where they are 'deconstructed' and treated as separate elements.

The origins of Swiss design lay in the ideas of geometric and grid orientated type-faces, the deconstructionist theory relating to this area shows a great contrast. "The field of typographic design has seen a shift from the structuralist approach of modernism and neo-modernism to a more skeptical and inclusive view of digital technology." (Byrne, 1990, p.18)

Chuck Byrne notes that within the last few years, "typography and design in general have been influenced either directly or indirectly, knowingly or unknowingly by the concept of deconstruction" (Byrne, p.116). Most designers would not notice or believe that they belonged to this concept. Byrne says, designers moving in these directions "vehemently deny any knowledge of deconstruction, much less admit to being influenced by this encroaching concept from critical thought and philosophy" (Byrne, p.116).

Deconstruction design – the work produced in magazines such as *Emigre* by

Vanderlans or Ray Gun by Carson – has raised issues concerning legibility and readability. Though these are interrelated terms they refer as Walter Tracy notes to very different aspects of reading and legibility. ref.

Legibility is used to determine the ability to recognise individual letterforms. Small or distorted type can cause illegibility resulting in misinterpretation and a jarring effect on a person reading.

Readability on the other hand is a measure of the strain or otherwise in reading a body of text. It refers to the comfort in reading large bodies of text rather than actual letterforms or sentences. For example upper case in a bold font is legible, however if the article was written in the same way it would be extremely difficult to read. It would therefore have a high legibility but a low readability level.

For the swiss Designers of the 1950s, these aspects were of great importance for the clarity of communication through design. This was evident in their use of clear balanced type faces like Helvetica or Univers following with ideas of good legibility. Their use of the structured form of the grid and concern of the layout of text creating comfortable readability.

However, with deconstruction graphics of the late 80s, there was a parting from the traditional roles that both legibility and readability played. Designers now deliberately changed from the ideas of earlier movements. There was now a radical use and design of typefaces like, Keedy or Template Gothic. The breaking up of forms and destructed layouts pushed the boundaries of what could be considered good legibility or comfortable reading.

The ability of text to be expressive as graphic forms in themselves means that the legibility of individual forms is not so much a concern. David Carson has said, “we should not confuse legibility with communication.” One does not necessarily lead to the other, “just because something is legible does not mean it communicates; it could be communicating completely the wrong thing.” (Carson, 1992, p.14)

With most changes in any area there are usually two points of view. This is the case with digital typography. There are the traditionalist who argue that type should be legible and this is its soul function. Others believe that typography in the computer format is new and not to be judged by the old traditional rules. It is a case of whether the type should be visible or not on the page. There were arguments in the past about how type should function. () points out that in 1890's William Morris complained about the forms of the victorian type designers with their excessively visible work. Also in 1920's, Eric Gill wanted typography to be invisible, purely carrying the message without distraction. The bauhaus type designers like Paul Renner disagreed, saying that the typeface should reflect contemporary standards.

Today's discussion is similar in terms between traditional forms and those who prefer contemporary styled letterforms. Rick Poyner sees this freedom in terms where “The traditionalists argue that the accessibility of the technology will accelerate the decline in typographic standards that started with the first clumsy photocomposition systems began to replace lead type”, and a new optimistic view in which, “everyone will compose let-

ters in personally configured typefaces as idiosyncratic as their own handwriting".(Poynor, 1990, p.115-121). This is a debate that is common when there are radical departures from the normal. The new threatening the old traditions and heritage.

Dramatic experiments with typography have been performed by Edward Fella. His work pushes the conventions of typography, using damaged and defective forms he arranges type using out-of-date manual skills, including hand lettering and meticulous paste-up production. Rick Poynor notes that in his work he breaks every known rule of typography and good taste. "In Fella's agitated hands, type is spun, tilted, stretched, sliced, fracture, drawn as if with a broken nib, and set loose among fields of ink-blotter doodles and deranged network of rules."(Poynor, 1991, p.85)

He is a designer who has rarely works with computers, relaying instead on a range of hand skills. However, his work has a structural affinity with digital produced typography. () points this out in a quote by Fella in which he says, "I actually feel that i started to think like a computer a while back, almost inadvertently or instinctively. Some of may work preceded the computer, in that i was doing all the things that were difficult to do manually, but are so obvious and easy to do on the computer, like the mixes of typefaces, the slight differences in size, the distortions, the irregularities....I just avoided the first phase of the computer, the bitmap phase."(Fella, 1990, p.57)

The work of Fella has influenced the development of deconstructivist type. His posters for the Detroit Focus Gallery, produced between 1987 and 1990, featured damaged and defective type – from third generation photocopies to broke pieces of transfer type. These imperfect elements were meticulously assembled by hand into free form compositions. These experiments have inspired other designers to construct digital fonts with the same aesthetic qualities.

While Fella has sidestepped the computer, his students including Barry Deck, who began designing typefaces at Cal Arts, are avid users. However they still value hand-drawn and mechanical letterforms for there impurities and flaws. Rick Poynor notes that, "hand-in-hand with this investigation the new aesthetic possibilities of the computer comes a revaluation of the artless and the ugly, the hand-made and the ready-made."(Poynor, 1991, p.85)

This is seen in Deck's typeface Template Gothic It was based on an old sign he found and is an attempt to, "capture the sprit of crude lettering templates by using truncated serifs, erratic tapered letterforms, and letters that look like they are degraded by photomechanical reproduction."(Poynor, 1991, p.85)

The typeface was debuted in the pages of Emigre in 1990, and was a response to one of Fella's hand-made poster. However unlike Fella's work, it was created entirely in the digital environment.

Poynor notes Deck's involvement in the deconstruction of the type with Deck saying, "I am really interested in type that isn't perfect....type that reflects more truly the imperfect language of an imperfect world inhabited by imperfect beings."(Poynor, 1991, p.85)

The movement from metal letters to digital has not taken generations, and has hap-

pened in the space of most designers' career. This has changed for most the way in which graphic design is practiced. The great craftsmanship of typography has disappeared with the computer as the new tool. Type design and type setting is a skilled craft, and in the past before even touching the equipment the discipline of type had to be well understood. Carter points out that after 500 years of movable type we are now at a stage where we have mutable type. Typography and type design are now for the first time in history being practiced by amateurs. "As the technology created means for any user to arrange type on a page, and to alter fonts for personal pleasure, costs are paid." (Labus, 1996, p.35)

Philip B. Meggs notes that the introduction of the computer to our homes and work places has created, "a new generation of unschooled graphic designers – editors, public relations agents, secretaries and other do-it-yourself desktop publishers are totally ignorant of the rudiments of publication design and typography." (Meggs, 1989, p.161) - ref ?

Meggs sees the implications of this and in his article for print magazine he notes the computer as "the obscene typography machine". He acknowledged its great potential for increased speed and control but that this wonderful tool that is revolutionizing graphic design has its dark side. "Unfortunately, the ease of computer use puts potent graphic capabilities into the hands of people who are devoid of any aesthetic sense about typography and have little or no understanding of the most basic principles of design." (Meggs, 1989, p.160) Looking closer

The software programmes available give the power to manipulate type by flipping, rotating, stretching and bending it with the click of the mouse. These distortions can be useful and innovative when used with sensitivity and intelligence, however, "we are seeing type distorted in violation of everything that has been learned over the past 500 years about making functional and beautiful letterforms." (Meggs, 1989, p.160)

The case for why not to needlessly distorted letterforms is that these shapes were laboriously designed for their balance and proportions between the individual strokes of the letterforms.

The optical harmony is achieved with hours of work refining the strokes until they seem proportionate and balanced. A letter composed of curved strokes such as an O, actually extends slightly above and below the caps heights. Otherwise it would look smaller compared to another letter like E. This optical refinement is not mathematically based but aesthetically and perceptually.

Stretching a word to fit a space therefore destroys the balance between the horizontal and vertical strokes. If a typeface is stretched into a taller condensed version the horizontal strokes will be wider, while the vertical will maintain their width. The result is disproportionate letterforms and the aesthetical value of the typeface altered.

The idea of kerning is also a problem. When letters are type the space between is preset by the computer. This is fine for small text, but when anything greater than 18pt. is used the disparities show up. Here the skills of the designer is needed to optically adjust the spacing between individual letterforms. Meggs notes that the computer is, "a dumb robot totally ignorant of the principles of perception", and in this sense has

no regard for the idea of visual aesthetics. To an untrained persons this can lead to an absence or distortion concerning careful letter spacing.

It is these details that are the skills and craft of typography. While professional designers can explore new creative possibilities and spend more time developing concepts and designing, with its increasing availability, Meggs points out that its darker side must be controlled.

Not all typeface's are good, practical or well designed, and without the knowledge of these facts, which typeface to use, where and when to use. A person confronted with this large array of options can be lost as to what are the right chooses to make. In a lot of cases typefaces have been chosen which are not the right ones for the job in hand. They are used out of context to structure, historical placing and style.

The consequence of this bad typography is a failure to communicate. Although the information in the text may be useful or important to the reader, the typography and how it represents this information comes between the writer and reader. If a breakdown in communication occurs even when the writer has made the best effort, this is usually the fault of the designer.

Multi-media has had a lot of hype attached with it and this has brought it to the attention of a lot of people. It has had very high expectations placed on it with its ability of interactivity and its use of 'multi' medium forms, sound, images, video. This has led to many misconceptions as to what it is, what it can do and what place it has in society. Rulf Hebecker and Justus Herrmann are multi-media consultants and have pointed out some of the mistaken assumptions on the subject.

The notion that multimedia is the solution for all communication problems as "only certain contents can be conveyed adequately by CD-ROM", (Hebecker, 1997, p.19-21) There are other problems of distribution and getting people to use it and take the time to search through it and get information. In most cases print material may do the job just as adequately without most of the problems associated with the computer medium. "There is little point in inputting the pages of a catalogue by scanner and storing them on CD without at the same time ensuring the data offered is organised and linked in a new way". There are however hundreds of titles released each year causing a "digital textual wasteland", and offer no added benefits. So this medium should only be used if it makes sense to do so and its abilities to convey information fully released.

The assumption that multimedia is cheap and easy to produce is another misleading idea. While the medium itself is cheap to produce, a CD costing a few pence, the work involved in getting it to that stage is much more considerable than for printed media. Electronic communications involve the same outlays for printed material but there is the additional cost and effort for "staging the medium, namely for: linkages, screen design data conversion, animation, programming, platform compatibility function testing and research." (Hebecker, 1997, p.19-21). So it is clear to see that although multimedia has great potential for transferring information and creating new ways of enhancing and exploring information it is not as straightforward as it may seem. Involving a lot of hard work from usually a large number of people.

With the emergence of graphics on screen a new design theory should therefore emerge. Up to now there has been no real standard or direction that this should take. People are still searching and exploring new meanings and directions for this new media to take. A new language of communication needs to be developed. Florian Brody like other media developers refer to this idea that, "interface design and computer graphics should become a discipline referred to as information design." (F. Brody, 1997, p.). Also saying that knowing how to use it and, "creating good information design will offer us the means to manage both new Media and new paradigms of communication".

Multi-media and new media are two names for basically the same thing. With in these terms they encompass everything from CD-ROMs to the internet and relate to any form of information displayed on screen. The 'multi' meaning more than one form of media – sound and images – can be easily noticed and comprehended. However the notion that this is 'new' media is not quite as clear. Asking the question what is so new about new media.

Clement Mok asks "what is novel about reading poetry as you listen to somebody else read it aloud? What is new about blending animation with music, or playing com-

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The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present and for the development of a sound policy for the future. The author points out that the study of history is not only a means of acquiring knowledge, but also a means of developing the ability to think critically and to make sound judgments.

The second part of the paper discusses the role of the government in the development of the United States. It is argued that the government has played a crucial role in the development of the country, and that its actions have shaped the course of American history. The author points out that the government has been responsible for the establishment of the Constitution, the development of the federal system, and the promotion of economic growth.

The third part of the paper discusses the role of the individual in the development of the United States. It is argued that the actions of individuals have played a crucial role in the development of the country, and that their actions have shaped the course of American history. The author points out that individuals have been responsible for the establishment of the Constitution, the development of the federal system, and the promotion of economic growth.

The fourth part of the paper discusses the role of the future in the development of the United States. It is argued that the future is a time of great opportunity, and that the actions of the present will shape the course of American history. The author points out that the future is a time of great opportunity, and that the actions of the present will shape the course of American history.

plex games with unseen opponents or viewing a painting up close?" (Mok, 1996). It seems that most elements in the new media are represented in all the old media. It is seen that much if not all of the individual mediums can be seen in one form or another in different areas.

We see in interface design, metaphors from our physical world. Navigation and activating events is really button pushing. Screens usually contain icons which don't mechanically do anything but represent the idea of real world buttons and switches. They are borrowed from the physical world and are now a common sight thought out interfaces. As Florian Brody says, "light switches are bad enough on the wall, why would I need them on my screen".

At the moment much of the new media is shaped by the software and computers used to create it, much like what can be seen with printed material. Also effecting it are the designers and programmers – by what they can create and invent uses the equipment. Multi-media is still taking shape. It will take time to establish a format, much in the way the book has formed, that brings it to a new development stage where it could be classified and acknowledged as a independent media in itself.

Digital communications is rapidly expanding and gaining interest and involvement by people all over the world. This can be seen in the increasing number of Web sites and users of the internet. Also in the publication and use of multimedia CD-ROM titles which can be seen in schools, homes and corporate environments.

All this media that's now presented to us needs to be designed and it is the graphic designers skills that are being used to give all these new mediums a face. It is the designers place to effectively visual communicate messages, ideas or information. It is these traditional skills that are needed to enhance and develop the new media into a visual form for the consumption of the mass culture.

Digital computer technology has given us a powerful tool for the creation, presentation and exchange of information in all its forms, words, images, video and audio. With digital media there are obviously going to be comparisons between it and print. So how different is it as a means of conveying this information.

There are attributes to printed material that are taken for granted. Digital is a visual and audio world, the tactilness has disappeared from the medium unlike that of the book and print which takes on the sense of touch and even smell. There is a huge range of papers, weights, colours, textures to choose from. There are inks, glosses, matte finishes to enhance the physical qualities of the paper. The smell and feel of these inks and paper are what give them their distinct tactile qualities.

The smell of print and paper from a new book is not transferred to the new media. You don't get the same experience from first looking at a new CD-ROM as you do when you first open a new book. There are qualities absent in the new mediums that are present in all the printed material. The screen is a clinical environment and in certain ways very different for print. The screen is not an object that we can manipulate and shape to fit us as ergonomically like that of a book. It's not exactly a form that we can easily transport and view in the kind of places you can with a book. The portable lap-

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be carefully documented to ensure the integrity of the financial data. This includes recording dates, amounts, and the nature of the transactions. The second part of the document outlines the procedures for reconciling the accounts. It states that the reconciling officer should compare the internal records with the external statements provided by the bank or other financial institutions. Any discrepancies should be investigated immediately and resolved. The third part of the document describes the process of auditing the records. It notes that an independent auditor should be engaged to review the records and provide an opinion on their accuracy and completeness. The final part of the document discusses the importance of maintaining the records for a sufficient period of time. It states that records should be kept for at least seven years, as required by law, to ensure that they are available for future reference and audit.

top computer is certainly going in the right direction in size, but it is at the expense of a decreased viewing quality and an increased price.

Printed material although flat, is in fact a three dimensional object. It can be picked up and viewed from different angles. This is also lost in the digital computer format. There are no die cuts or embossing effects that create lighting and texture on the paper. It seems that we still want the tactilness that print has to offer.

Just because we use the structures and metaphors of printed physical material does not mean we can judge them both in the same context. They are both different experiences. They have different physical attributes and this leads to a different kind of experience when viewing each of them.

New media and the advent of electronic publishing have brought about questions about the nature and future of the book. The new media's seem to be offering people enhanced means to access information through their interactive and non-linear nature. "Our culture is literary based due to the production of the book and printed material". This does not mean that people will be forced to throw away their books and read from screens.

There are obvious differences between the two and these should be taken into account in examining them. Print material has a lot of qualities to offer that the screen does not. Multimedia is however new and should be looked at in its own terms. It has a whole new set of qualities that it does have to offer which is unique to itself.

It is right now not so much as a ^{revel} to print but a companion to and extension of what print can do. It will not replace print material or the book in the near future. Only if it becomes just as usable, portable, accessible, friendly and as cheap. Only then will people be fully intecided to make a transition to a new digital form of the book.

There does seem to be an excitement and great interest about all the technological developments that are happening now. This is coupled with the transition towards a new millennium. We are only at the start of the digital revolution and there is a lot more to follow. The digital format is a turning point in our evolution. It is shaped and manipulated into the existing electronic technology, standing on its shoulders, and pushing forward the capabilities of what can be achieved with it. The digital system is our own form of man-made science and a foundation for further developments in the future.

Technologies impact on design has been immense. Along side this technology all aspects of graphic design have changed. Compressing the profession into a common digital format has lead to a greater level of speed and control in its production. This speed and control means that the designer now has greater freedom to take a experimental approach to design. The design of a typeface is now done in a fraction of the time, enabling designers that would not otherwise have the opertuinty to do so. However while the computer is a very democratic tool for creating design, it wide spread use and the notion of amatuer typography is causing concerns about the great traditions of typogrphy. While this is a problem, it is up to the software commpanies to address these concerns. Within their programmes they should make user more aware of the stubilities of type manipulation.

As we have seen in the past, while tools are changing with relentless advances of technology, the essence of graphic design remina unchanged. This essence Meggs notes, "is to give order to information, form to ideas, and expression and feeling to artifacts that document human experience." (Meggs, 1992, p.473)

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