South African Design in the Digital Age

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The technological innovations of the last decade or so have revolutionised design, allowing fewer people to produce more in shorter periods of time. While technology can enhance and improve the work experience, to what extent can it ever change what it is that designers 'do'? This question is non-trivial because in the digital age we are now entering, there is much pressure on designers and design educators to prepare for 'the future'. In an attempt to address these issues, the following analysis deals with design from two different theoretical perspectives. Firstly, design as an act of labour in a changing context is explored. Secondly, design is treated as a social action within a broader production context both informing and being informed by this context. Through this dualistic approach design in the digital age can be viewed in its entirety.

Defining Digital

For any meaningful discourse, a definition of 'digital' is required. Digital refers to the act of representing phenomena, be they material or theoretical, as discrete binary numbers. Through these representations, the meaning, or the content, of the message/phenomenon can be stored. An example of numerical representation can be found in the alphabet which has 26 discrete letters. To numerically represent the alphabet we might assign A = 1, B = 2 etc. and from this we could represent all the words on this page with numerical combinations. Encoding the word 'dog' using this system of reference would yield 4,15,6. To decode this numerical reference all that is required are the rules for the reference numerical system.

Digital systems can encode phenomena such as sound, image and video, using the rules of binary number notation. These encoded phenomena are based on agreed upon reference systems such as TIF format in the case of images and WAV format in the case of sounds.

Digital is therefore a method of converting environmental and theoretical phenomena to a common representative numerical system, or to a common basic 'logical' grammar which allows for the efficient manipulation, alteration and presentation of those phenomena (Penrose 1990).

The Digital Age

The digital age refers to a period in history in which data manipulation technologies and networks have become ubiquitous and central to capital production. A discourse that explores digital as a paradigm provides a framework in which the assumptions about the act of designing can be critically examined.

Significantly, the digital age is not a computer age. Computers merely provide the physical mechanism for the delivery of digital media. When we see a television commercial, chances are it was edited and played out on a computer, yet we do not experience it as a 'computer generated advertisement', we see 'television'. The digital age is also characterised by the seamless integration of all communications and media into one vast networked medium (Negroponte 1995).

The digital age is essentially a paradigm that embraces the idea of the computer manipulation of information, and the ubiquity of digital networks as the primary delivery mechanism for all information. A paradigm is a set of assumptions, beliefs and values held about the world. More particularly, a paradigm dictates what is do-able. When reality challenges a paradigm's assumptions to the point that its assumptions have to be discarded, a knowledge revolution occurs and a new paradigm is created. A good example is the fall of the Newtonian paradigm in physics. Newton excluded the possibility of time and space being relative in his paradigm. Einstein's discovery that time and space are relative undermined Newton's assumptions, resulting in a new scientific paradigm (Kuhn 1969).

Central to any analysis of the digital age in a design context is the issue of whether the digital age so alters the assumptions of existing design paradigms that a fundamental change of paradigm has to occur.

Design as an Act of Labour

Design, like all human activity, happens within a social context. To understand design in a digital societal context it is essential to have a working definition of design as an act of labour in a capital economy. Design can be seen as part of the economic function of creating meaning, articulating dreams and giving ideas life beyond the mind of one individual. Articulated meaning is in itself a commodity, for

example architectural plans (Curry 1997). Furthermore, the act of expressing ideas in a design is the first step in building visions - an unarticulated idea cannot be built (Borgmann 1995). Capital growth (the creation of value) needs the production of commodities and services. A prerequisite of production is the creation of articulated meaning (or design).

As part of the capital production process, designers, be they architects, graphic designers, engineers etc. transform data (basic meaningless elements such as colour and letters) into information (units of meaning such as sentences), through the application of knowledge (that which is known generically through socialisation, and that which is known specifically as a result of activities such as training) (Curry 1997). The word encoding example of 'dog' mentioned above illustrates this phenomenon - letters have no meaning, through applying knowledge and assembling them into words and sentences, information i.e. meaning, is created. It is important to bear in mind that information and knowledge exist in a dialectic relationship with each informing the other over time.

The perspective of viewing design as the act of creating meaning (information) allows for an analysis of the impact of the digital age on design through a critical analysis of data, information and knowledge.

Data

Bearing the proposed model in mind, the concept of data in a digital context can be approached. Today, the ubiquity of digital data is profound. We are surrounded by reams of meaningless data, transmitted between points by radio waves, cable, optical fibre etc. The volumes of data are increasing exponentially with the advent of digital computer networks which are creating a data-sphere - a physical infrastructure in which all data will reside and be transmitted. This will translate into the seamless integration of television, video on demand, radio, print and the Internet into one media space (Negroponte 1995).

The capacity computers have to assign numbers to the environmental stimuli that we perceive makes them powerful creative tools - they are highly efficient data processors. Whether storing sound, video, parts of images etc. in digital format, the basic data building blocks remain the same namely, a common numerical reference system for all stored representations of physical phenomena, and the capacity to randomly access data.

Random access refers to the ability to use a piece of information at any point within itself. For example, prior to the digital age video editors could not arbitrarily decide to change some part of their edit sequence. Digital technologies allow for the ability to arrange or rearrange all data elements in any combination in a non-destructive fashion - 'mistakes' can easily be undone and original data sources can be protected from alteration (Negroponte 1995).

Through technology the digital age is characterised by an exponential increase in the volume of data and an incredible set of tools with which to access it. The design challenge is to find a grammar that can make the sheer volumes of data easily understandable to and useable by people. The need for information (generated through design) is greater than ever before (Negroponte 1995).

Information

The meanings (information) that can be created as a result of the digital age and its associated technologies vary radically from previous periods. In both non-digital delivery media (traditional media) and digital media, digital methods have revolutionised information.

Traditional Media

In traditional media and design, digital technology's greatest impact has been in the production environment. The first noticeable sign was the impact DTP had on creativity and productivity. A DTP 'designer' does not need to spend years studying technique; for example, to apply a pencil sketch effect a designer simply applies the computer algorithm. Digital applications free designers from the mechanics of production and liberate them to focus on the results of their labour. Though digital tools it is possible to create more fantastic information unthinkable prior to the digital age (Michie & Johnston 1985; Negroponte 1995).

The film *Toy Story* provides an excellent case study of the power of digitally enabled 'traditional' media. *Toy Story*, a full length feature film, was designed, planned, executed and produced on computers. Digital tools allowed animators to use effects, techniques, camera angles etc. that cannot be generated using any other animation technique. As a media work, *Toy Story* redefined animation by creating superrealistic lighting effects and totally smooth integration of backgrounds and characters (Snider 1996). In short, *Toy Story* created a new animation paradigm by altering the core assumptions of, and beliefs about animation as a medium (Kuhn 1969).

Digital Media

The digital age presents new media phenomena - digital media. Digital media such as CD ROM and the Internet are designed, produced and delivered in digital format, offering designers new creative opportunities because they engage audiences in new ways.

Central to the digital media paradigm is the idea of exploring the way information relates with its audience, the audience with it and the ways in which this interaction can be moulded. Digital media introduce a new level of media interactively since media messages can now change in response to the viewer/audience (Michie & Johnston 1985; Negroponte 1995).

Digital media also occur in theoretical space and time, for example on the Internet viewers can interact with virtual entities, information and data that only exist in the memories of machines, 'Web sites are new representations of abstract space' (McMillan 1997: 133). Spaces, sounds, animations and visuals are created in a fantastic space where the limitations of the physical world can be designed away - design in theoretical contexts has become a reality (Negroponte 1995).

Many CD ROM titles transport the audience into realms of fantasy where the 'physical' as we know it is deconstructed and reassembled in a more fantastic form, for example viewers can experience flying. As technology advances these experiences will become more and more immersive i.e. offer audiences more and more dissociation from the 'real' world and more compelling association with the machine generated virtual world. Ultimately, complete immersive experiences will occur where, touch, smell, sight and sound are all computer generated (Negroponte 1995).

Central to digital media is the fact that audiences have random access to the media message. Viewers can simply point themselves in new directions, tell computers what they want to see, and what must be ignored. Designers therefore have to create information that is not only relevant, but enticing and competitive in relationship to other similar information sources. Prior to the digital age it was guaranteed that designs, if placed correctly, for instance on the front cover of a magazine, would be viewed. In the digital age, the media consumer can choose to never view a design, to randomly move from one message to a competitor's message, to demand a comparison of information, to demand...

Knowledge

Having established the nature of data and information in a digital age, attention can be directed towards knowledge. More specifically, the issue of what new knowledge needs to be acquired by designers to remain effective in the digital age can be addressed.

In terms of generic knowledge, designers have to embrace the computer, not only as the primary design tool, but as the design environment. Computer networks are becoming the medium of communication in almost all production environments. The computer network as the media space will become more and more entrenched to the extent where the majority of people understand and use interactive networked media technologies. Twenty years ago, the VCR was an anomaly, but today it is a mainstream cultural feature. Computer networks, currently manifested in the Internet, too will become mainstream cultural phenomena and using them will be generic knowledge to media/information consumers from all walks of life.

In terms of specific knowledge, designers will need to understand the construction of information/meaning in an age where borders are psychographic not demographic. Creating information for a particular type of consumer 'mind', not age, gender etc. is critical in a media space where people can choose and interact with information, redefine their body experience in virtual spaces and be geographically anywhere on the globe (Negroponte 1995). The knowledge to create meaning in theoretical spaces and times needs to be acquired if designing for digital media is to be approached meaningfully.

Design as a Social Act of Production

Having investigated the individual context of design as an act, attention can be directed towards the socio-economic implications of a digital production environment and a digital age in the Southern African context.

Central to the digital age is the idea of network oriented work processes. In terms of the relations of production the greatest impact a digital paradigm has, is that it redefines the power relations of production through the provision of technologies that alter communications.

Pre-digital network media production is characterised by a detailed segmentation of the media production process, with some individuals 'conceptualising', others implementing, others setting up printers, others scanning and others being involved in quality control. This segmentation leads to the need for a bureaucracy to manage the process. More importantly, pre-digital networked production necessitates that each person in the media 'production line' is to an extent divorced from the aims, focus and nature of the media message. This in turn disempowers designers from the process which results in creators losing control of their work and of the products of their labour (Godelier 1977). This is not cost effective in highly competitive environments (Massey, Quintas & Wield 1992).

Computer networks radically alter the power relations of production on many levels. The digital age is a phenomenon of and vehicle for the globalisation of capital (Curry 1988; Gattiker 1990). One of the effects of globalisation is the commodification of information. The buying and selling of information and information production houses is a global trend that characterises late capitalism (Sony's acquisition of Universal Studios is a case in point). The demand for designers as creators of information is therefore significant in a global context, meaning designers as labour can no longer realistically expect to compete exclusively in local markets.

The global nature of digital environments also allows for a geographically distributed customer base, for example a company in Taiwan can commission a South African studio to edit a video. Globalisation of trade also creates a need for products and services that are globally competitive (Gattiker 1990). Through digital communications, the design production environment becomes a globalised one and the demands of the customer in terms of quality of service and product become 'international'. This represents a major departure for South Africans who have for too long lived isolated from the rest of the world.

In terms of internal management, digital production environments foster more autonomy of the workforce, and dilute the need for management (Massey, Quintas & Wield 1992). Digital production environments therefore lead to a leaner mode of production, one in which fewer people can achieve more by being closer to the data of their industry as well as to their customers.

Significantly, through the use of a digital production environment it is possible for a few people with a modest amount of capital to aggressively compete against even the largest design and media studios. In the South African context the digital age opens up huge possibilities to compete globally at lower costs, however, South Africa's historic introversion has led to a self-perception which

assumes technical and creative inferiority compared to our international counterparts, which may yet be our greatest obstacle (Bizos 1997).

While the benefits of a digital age are profound, the irony is that many employees see digital technologies as a threat to job security, whilst research strongly indicates that given appropriate work culture and strategy, '... automation in office settings may increase workers' skill levels and job autonomy' (Kelly, Gattiker & Greve 1994: 112). In a digital environment creativity and the ability to articulate ideas through media become a labour asset. A 'designer' is able to come up with the concept, evolve it, and eventually produce it - alienation from the end product is no longer a necessity.

In the final analysis, it is the efficiency of systems in the digital age that will lead to the evolution of current design environments to ones where there is more autonomy, more exposure to diverse media and a competitive attitude characterised by little management intervention.

Educational challenges

How should design educators respond to this new digital context? Today's designers need to know how digital systems treat and manipulate information - this need will continue to exist in the future. The ability to move from designing audio, to video, to text is essential in an age where media convergence is rapidly becoming a reality.

The challenge for South African designers is not only to become computer literate, but also to become digitally enabled. A shift from training students in the use of computer tools, to creating true comprehension of what technology is capable of is essential for a successful education strategy in the digital age. Through a better understanding of how all media are generated in the digital domain and what the advantages of this domain are, our paradigm can begin to shift to one that is leaner, highly competitive and global in reach. The inevitability of this shift is even more of a challenge. Until designers consciously embrace a paradigm in which design is the act of creating information out of data through the application of knowledge - the digital age will continue to be a territory perceived as high-tech and out of reach.

Conclusion

The digital age has increased, and will continue to increase, the market demand for digitally literate designers. The benefits of digitally literate designers far outweigh the costs of using non-digital production paradigms. Within digital media the sheer volumes of data requiring transformation into information, into valuable commodities and messages is growing daily.

In terms of design education these trends translate into a need for upskilling, not so much in 'computer skills literacy', but a need for a fundamental shift in the knowledge base of what a digital age means for data, information and society's experience of reality. With this knowledge designers will continue to do what they have been doing for thousands of years, creating meaning through the manipulation of space and time, which is what ultimately defines the human experience (Shanks & Tilley 1987).

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