HYPER-IMAGE NETWORK?

An investigation into the role of text and image in the design of hypertext networks with specific consideration of the World Wide Web

By Axel Vogelsang

A thesis submitted in partial fulfilment of the requirements
for the degree of Doctor of Philosophy
Central Saint Martins College of Art & Design
University of the Arts, London

March 2008

For Hecki

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ACKNOWLEDGEMENTS

First of all I want to thank Bridget Wilkins and Richard Doust for accompanying me in this journey and for enabling me to achieve this work.

I'm also very grateful to the Arts and Humanities Research Council (AHRC) for supporting my research by covering most of my tuition fees.

At an early stage of my research, Lizbeth Goodman, the founder of SMARTlab, informally affiliated me with her own research team and supported me far beyond what could be expected from an adviser. Her support in all kinds of academic issues was indispensable and the many bright, charming and highly creative people I met through her in the SMARTlab and in the SMARTlab PhD group were a huge inspiration and motivation at all times.

I also owe a great deal of gratitude to Klaas Kuitenbrower from Mediamatic in Amsterdam who did support me as an external advisor during the last two years. The long discussions with him as well as his Mediamatic workshops triggered some crucial developments in my research.

Similarly, the great expertise, insight and empathy of my friend Andrea Lioy from Central Saint Martins College proved tremendously important factors in the development and completion of this research. Andrea was a recurrent dialogue partner and undertook huge efforts to read my thesis and help me with the process of structuring. The first sentence and the last sentence are dedicated to him.

Jona Piehl took the effort to read my first draft and gave me very valuable feedback from a graphic designer's point of view.

One of the big milestones was my artist residency at the ETH (Swiss Federal Institute) in Zurich and so I am immensely grateful to all of the people who made this project possible: Professor Dr. Jill Scott from the Zurich University of the Arts initiated the Artists in Labs programme in the first place and has always been extremely motivating and supportive during and beyond the project. Professor Dr. Moira Norrie at the ETH embraced me as a team member from the start and allowed her GlobIS Lab researchers an immense freedom to support me and to spend their valuable time working on our project. Dr. Beat Signer was the main scientific collaborator. His brilliant work over the recent years laid the foundation on which our piece – The Lost Cosmonaut – was built. He since has remained a huge source of help and a friend. His colleagues Rudi Belotti, Corsin Decurtins, Ljiljana Vukelja and Nadir Weibel also supported me with great expertise and enthusiasm. Again, Andrea Lioy's help in concep-

tualizing and writing The Lost Cosmonaut was priceless. Similarly important was the score that my friend Kurt Schlegel produced for this piece. Thanks also to Nigel Heyler, Tiffany Holmes, Greg Skerman, Clea Waite and Adrianne Wortzel for contributing to the project.

I would also like to thank Professor Dr. Stephen Regan from Durham University and Professor Dr. Paul Lefrere from the Open University for reading my thesis and making themselves available for a mock viva. Their advice and encouragement was a huge motivation for the final phase.

Last but not least: many thanks to my MA student Xiaoman Wang for providing me with a screenshot of the Pinyin Latin-Chinese transliteration system (chapter 3.8) and for explaining to me how it works.

ABSTRACT

The idea of the iconic turn relates to a perceived increase in the use of images and icons for communication purposes during the 19th and particularly the 20th century. More recently, various theorists have further argued that digital media and specifically hypertext media are a catalyst for this development. The multi-linear approach of hypertext, the increasing integration of pictures, moving image and animation in the Internet as well as the dominance of the graphic user interface (GUI) are seen as major indicators for a paradigm shift towards a dominancy of the image for the purpose of information exchange. The argument culminates in the idea that the envisioned change will come at the expense of alphabetic text and will amount to the end of the use of prose for communication purposes.

This thesis questions such notions concerning the iconic turn with respect to digital writing. It compares them to the status quo of design practice particularly in digital media networks such as the Web and reveals fundamental discrepancies between theory and this practice. It will be demonstrated that hypertext and specifically the Web to the contrary are still very much text-based environments, strongly built on both the diachronic[1] and synchronic qualities of language and the two-dimensional expression that is possible through alphabetic writing. This work also explains how proponents of a pictorial approach towards digital communication have been misled by early day phenomena and wishful thinking.

This thesis draws from cognitive science, cultural history, information theory and linguistics as well as from current design practice. Design practice plays an important role in the discussion regarding digital writing and the iconic turn as it is held partly responsible for the shift from alphabetic text to the image by some of the theorists arguing in favour of image writing. A new understanding of the role of the designer in the context of digital writing will be proposed because, as it will be demonstrated, notions of graphic design as a catalyst for the decline of the alphabet are based on a fundamentally flawed perception of the role of the designer in digital media.

[1] 'Of, relating to, or studying the development of a phenomenon through time' ('diachronic', 1991, *Collins English Dictionary*, third edition)

LIST OF ILLUSTRATIONS

All illustrations and photos in this text are only used for the purpose of presentation in the context of a doctoral thesis and thus, their reprint is not infringing any copyrights of their originators. Should this thesis or parts of it be published beyond this purpose, the author will contact the originators in order to obtain copyrights.

Figure 1: A splash screen for a multimedia presentation on Arkansas' used by Bolter to emphasize the high impact of 'writing with images' (Bolter, 2001, p. 72) which he sees as one of the main characteristics of digital media. (Image source: Bolter 2001, p. 73)

Figure 2: *Soirée du Coeur à Barbe* by Ilia Zdanevich. Zdanevich is a proponent of Russian Futurism and thus, a representative of the modernist avant-garde of the early twentieth century. His work is an example of the general tendency of visual poetry to push towards an iconic use of type. (Image source: Drucker, 1994, p. 190)

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Figure 6: *Del.icio.us* is a so called social bookmarking website, where users do not only store their own bookmarks, but also share them with others. Each bookmark is heavily

supported through textual descriptions and markers. Additionally, semantic relationships are often expressed through very subtle variations in type size or color. The listing to the right is a so-called data cloud. (Image source: screenshot from <http://del.icio.us>)

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Figure 11: A page from Jacques Derrida's *Glas*. Glas is organized in two columns, the left one a text about the German philosopher Hegel, the right one about the French writer Genet. Like the Talmud those texts meander their way around other texts, in this case quotations taken from Hegel and Genet themselves but also from dictionaries. Glas was Derrida's attempt to break apart the allegedly linear structure of the book. (Image source: Derrida, 1986, p. 57)

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Figure 15: *Second Life* is a virtual social environment in which users are represented through self-created avatars. Communication between the avatars is currently text-based and so whenever an avatar involves in a conversation his hands are moving through the air as if they were typing on a keyboard, just as the female character does in the middle of the picture. This is a simple visual feedback feature to show the user that his dialogue partner will soon respond. (Image source: screenshot from the application Second Life)

Figure 16: This image illustrates how light enters the eye through the lens and is then projected onto the back of the eye, the retina that is. This might lead to the conclusion that visual perception is somewhat comparable to taking a picture with a camera. However, once this information has reached the visual cortex of the brain, it has little to do with the original input. It is fair to say that the brain constructs the image rather than receiving it. This insight challenges the notion of the image as being a more direct and 'concise' (Stephens, 1998, p. 61) form of information about the environment than language. (Image source: McKnight, Dillon, & Richardson, 1991, p. 46)

Figure 17: *Pinyin* is a transliteration system which allows the usage of a Latin keyboard to input Chinese characters on a computer. To write, for example, 'Beijing', which means 'north capital' in Chinese one writes 'bei' in pinyin (top image) and a floating bar presents the writer with a list of characters fitting the pronunciation. In this case it is the character No 2. The writer will then have to do the same with the second syllable

of the word 'jing'. The system though works on the basis of predictive text so that the user does not constantly have to choose from the menu bar. Choices will be predicted and offered to the user according to context. (Image source: screenshots from Microsoft Word provided by Xiaoman Wang)

Figure 18: An example from Neurath's *Isotype* picture language of the 1930's. The five icons were used to describe the world population along ethnic lines. While Neurath (1936, p. 20) claims that Isotype is a non-judgemental scientific language, this example shows how culturally biased even this iconic system actually is. First of all, Neurath (p. 45) encourages the use of specific colors (white, red, black, brown, yellow) to describe the ethnicities of the world. Nowadays, this would earn him the label 'simplistic' at least and 'racist' at worst. The idea that 'brown' people wear turbans while 'red' people wear sombreros and 'black' people no hats at all feeds from similar colonial stereotypes. This is just to confirm that language is never objective. (Image source: Crow, 2006, p.71)

Figure 19: A truly conversational interface: in John Carpenter's 1974 debut feature *Dark Star*, Lt. Doolittle is involved in philosophical discussions with a bomb attached to the outside of the space ship, trying to convince it that it would be better not to explode (see footnote 73). While only a vision in the 1970s, call centers have meanwhile established verbal communication with machines as an everyday commodity. However, this form of spoken interaction is mainly reduced to media which are based on oral communication in the first place, such as phonelines. Visual media are most likely to be controlled by keyboard, mouse or other tangible interfaces.(Image source: screenshots from a clip on youTube, <http://youtube.com/watch?v=qjGRySVyTDk>)

Figure 20: What the infamous paperclip is for the Windows community is the Mac on feet for the Apple user. This help function is a typical interface based on the idea of dialogue. (Image source:< http://www.heise.de/tp/r4/artikel/7/7073/3.html>)

Figure 21: Screenshots from Dough Engelbart's famous demo at Stanford Research Institute in Menlo Park in December 1968. He (left) demonstrates the NLS, the first computer interface to feature mouse, pointer and windows. The screenshot in the middle shows the revolutionary concept of spatial layout of data where up to then the command line was the norm. Spatial layout though, asks for a more direct interaction with the screen than the keyboard provides for. Thus, on the right side of the keyboard (right) there is the mouse which allows pointing at and the selection of objects on the

screen. (Image source: screenshots from a movie clip on the *MouseSite* <http://sloan.stanford.edu/MouseSite/1968Demo.html>)

Figure 1: A screenshot from the desktop of the 1981 *Xerox Star 8010*. The Star work station came with the prototype of a first generation graphic user interface for office applications. It heavily inspired the designers of the first commercially successful GUI which was rolled out with the Apple Mainthosh in 1984. In these early years desktop icons were black and white and had a strong outline, and maybe a few more lines to describe the surface or to represent a very crude notion of the third dimension. This degree of abstraction was down to technical necessities as in the 1970ies and early 1980s computers mainly used 1-bit monochrome monitors. (Image source: <http://toastytech.com/guis/starbitmap2.gif>)

Figure 23: A screenshot from *Apple OSX Leopard*, the current state of the art operating system for the Apple computer. The 32-bit color standard (16 million colours) combined with increased definition of modern screens allows for an increasingly sophisticated GUI. The designers of Apple have not only increased the plasticity of the objects, they have also introduced central perspective and reflection in order to give the impression of three-dimensional space. Thus the icons are not stitched onto a surface any longer but seem to stand or hover over a little stage which expands from the bottom of the screen into what seems like an open space. The current GUI appears to be the ultimate expression of the iconic turn. (Image source: <http://www.guidebookgallery.org/>)

Figure 24: Microsoft's disastrous shot at real-world metaphor: the *Bob* interface from 1995. As difficult as it is to challenge a common and widespread interface paradigm, the failure of this attempt was at least as much related to the implementation and design of the chosen house metaphor. The vehicle of this interface metaphor, the home, gets in the way of the tenor, the actual tasks the user has to deal with, such as writing letters or emails. The metaphor contains by far too much information. (Image source: <http://www.guidebookgallery.org>)

Figure 25: *Microsoft Word 2003*. The icons in the toolbars strongly contrast with the slight grey background which makes them come to the fore. Also, the process of activating the toolbars or ribbons is hidden in a drop-down menu and in order to activate one of them, the user has to find the right drop-down in the first place. This leaves him in total limbo as to what the available functionalities are. So either he leaves open as

many ribbons as possible to see all the available features, which then leads to the visual overkill of up to 80 icons and more, or he has a reduced number of ribbons open which in the worst case results in having to browse through several drop-down menus in order to find a specific functionality. (Image source: screenshot from Microsoft Office application)

Figure 26: *Microsoft Word 2007*. The icons blend much more into the background which gives the text a higher visibility. (Image source: screenshot from Microsoft Office application)

Figure 27: Clippings of the header sections of *MS Word 2007* (left) and *Word 2003* (right). Besides introducing a system of tabs resting on a ribbon and, thus, drastically reducing the amounts of visible icons, the 2007 version has added text to nearly every icon. (Image source: screenshots from Microsoft Office application)

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Figure 30: Durell Bishop's marble answering machine. The idea of this conceptual piece of design is that each call left on an answering machine is embodied by a marble. Once a message has been left, a marble rolls from the body of the answering machine into a try. The user picks the marble up and drops it into a slot in the machine in order to replay the call or he puts it into a slot on the phone which then automatically calls back the number of the caller who left the message.
(Image Source: <http://www.prusikloop.org/>)

Figure 31: An alternative approach to word processing. *Microsoft Word*, as the market leading word processor, has been harshly criticized for its feature overload and difficult interface (Fuller, 2001). *Ulysses* makes away with pages and formatting. This product, aimed at creative and scientific writers, concentrates on the organization of

the text rather than on its looks and gets by without any icons. (Image source: screenshot from Ulysses application)

Figure 32: To activate the *LaunchBar* application the user holds the Apple-key and hits the Space-key. In order to search and open a document or an application he then simply types an arbitrary abbreviation of the desired file name such as M-S-W for *M*icro*s*oft *W*ord or D-I-5 for the file *di*ssertation_0*5*. LaunchBar instantly provides the user with a menu of all the documents it considers to be related to the abbreviation. The most used as well as the most recently used are placed towards the top. The menu is navigated with the up and down key. The tool can also be trained so that specific documents appear on top but most often LaunchBar immediately comes up with the right solution on top anyway. Whatever document is on top can easily be opened with a hit of the return key. The whole process is extremely quick and straightforward. Opening a specific document which is hidden somewhere in the depth of the hierarchy of the folder structure takes only the time it needs to quickly hit a few keys: Apple-space-D-i-5-return; a matter of a second and no mouse operations involved. (Image source: screenshot from LaunchBar application)

Figure 33: *Flickr* is one of the successful examples of the recent trend towards social platforms also known as Web 2.0. Flickr allows its audience to upload, organize, share and search images. Whilst the content of this platform exists of images, the various forms of organization of the same content is mainly text driven as the images are embedded in an ongoing conversation between the users of Flickr which provides the semantic context for the imagery. (Image source: screenshot from <http://www.flickr.com>)

Figure 34: Several magazine cover designs taken from *The End of Print: The Grafik Design of David Carson*. There are suggestions that Carson's style is not only visual expression of the demise of the age of print but also the harbinger of what is to be expected from design in the digital age. If Carson's work is anything to go by then digital media is pushing ever harder towards an amalgamation of text and image. (Image source: Blackwell, 2000)

Figure 35: These flyers are evidence of the psychedelic and flamboyant graphic style, so typical for much of the design surrounding the techno culture of the early and mid 1990s in Europe. The visual abundance reflects the enthusiasm that designers showed for their new digital tools. These designs were concurrent to the work of David Carson,

and not unlike Carson, techno graphic design often favors the iconic and pushes for the conflation of text and image. The question though is, whether this visually loaded form of graphic communication is really what is to be expected from the digital age or whether it is a momentous phenomenon. (Image source: Klanten, 1995)

Figure 36: A picture like James *Bond Island II* by the photographer Andreas Gursky is arguably much more representative of the visual sensitivity of current digital age than any of the excesses of Carson or the Techno movement. With subtle editing, Gursky transforms images of the Thai coastline into a dreamlike artificial scenery which could almost be true. The beholder is left in a limbo, not really able to tell whether this landscape exists in reality or whether it is the result of image manipulation. Thus, Gursky's work reflects the subtle and sneaking intrusion of digital media in all aspects of life. (Image source: <http://timconnor.blogspot.com/2007/06/andreas-gursky-new-photographs.html>)

Figure 37: In 1993, *Xplora* by Peter Gabriel was one of the first artistic CD-ROMS that made a big impact. Its style resembles a combination of TV and print graphics. Authoring tools for CD-ROMs such as Director gave the designer full control over the layout just like in print but with the added features of movement and advanced interactivity. (Image source: screenshot from Gabriel, 1993)

Figure 38: Above an example of a website designed via a design-grid with *GoLive*. The designer simply drags and drops text-fields and images onto a design grid (left). The advantage is that he does not need to know anything about HTML but the automatically generated code (right) is rather extensive. (Image source: screenshots from the GoLive application)

Figure 39: A similar website written without a design grid (left). This approach asks for some coding knowledge but as a result it produces much leaner code (right). (Image source: screenshots from the GoLive application)

Figure 40: In 1997 *Cabocorp* was one of the first, if not the first website excessively utilizing the powers of Flash as a tool for web-based animation. The navigation (middle and right) was organized in a so called revolver menu, where the single navigation items on touch would impressively revolve around the centre of the page, each movement underlined by impressive sound effects. It seemed that the times of restrictive HTML were over and that the Web was finally prepared for rich moving graphics. (Image source: screenshot from <http://www.thefwa.com/flash10/gabo.html>)

Figure 41: The website of *2Advanced Studios* was chosen the most influential Flash-based website by the users of The Favorite Website Awards. It clearly shows one of the main strengths of Flash: building impressive stand-alone environments that concentrate on high visual impact. (Image source: screenshot from <http://v3.2a-archive.com/>)

Figure 42: The 2007 *GTI* promotion allowing the user to individually build his dream-car and then go for a virtual test-drive with' Miss Helga' on the passenger seat. Like with the 2Advanced Studio site (figure 42), Flash is used to produce a video-game like immediate experience where data interchange is of less importance. (Image source: screenshot from <http://www.iqinteractive.com/vwgti>)

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Figure 45: The homepage of the *White House* in 2007. Content, mainly text, rather than representation has taken the precedence. The site appears in many ways like a professional news platform. In comparison, the screenshot from the same domain ten years earlier (figure 44) now looks rather crude if not tacky. (Image source: screenshot from <http://www.whitehouse.gov>)

Figure 46: To the right the homepage of the state of Arkansas in 2007. It is quite far from the image dominated splash page that Bolter presents as an example of image writing (left). (Image sources: Bolter 2001, p. 73 and screenshot from <http://www.arkansas.gov>)

Figure 47: The home page of *the Guardian* in January 1999 (above) shows a very high proportion of images as well as alphabetic texts turned into image formats. In the version of the Guardian as it presented itself in January 2001 (below), the ratio has slightly shifted towards text but there is still a very high amount of information embedded in image formats (all image formats are marked with a grey overlay and a dotted outline). (Image source: screenshots from <http://web.archive.org>)

Figure 48: By autumn 2007 *the Guardian* home page got rid of most image-turned-text. The Guardian logo, one of the few texts still in a graphic format is reduced in size and the general text-image ratio has changed in favor of text. There is also a very clear visual separation between text and image (all image formats are marked with a grey overlay and a dotted outline).
(Image source: screenshot from <http://www.guardian.co.uk/>)

Figure 49: *GoogleReader* is an online newsfeed reader that allows the combination of any newsfeeds into a personalized news portal. (Image source: screenshot from personal account at <http://www.google.com/reader/>)

Figure 50: *Overplot* is a so called mashup which combines different sets of data into a new application. In this case, it is a combination of oneliners and short conversations which people have overheard in the streets of New York combined with GoogleMaps. So the map becomes an interface for navigating through overheard conversations. (Image source: screenshot from <http://persistent.info/overplot/>)

Figure 51: the *Google* start screen. *To google* has become a synonym for browsing the Web. In a sense, Google not only represents browsing but the Web itself. Not being included in Google's database is like not existing at all. At the centre of the page is a text field for entering search terms in letters as Google's semantics is purely based on the comparison of alphanumeric signs. (Image source: screenshot from <http://www.google.co.uk>)

Figure 52: *Mon Couer* by Apollinaire. The *Calligrammes* of Apollinaire are little drawings with text and letters, playing on the relationship between signifier and signified. (Image source: Drucker, 1994, p. 158)

Figure 53: *At night in her bed…* by Marinetti. Marinetti often strongly emphasizes the graphic quality of letters, turning words into onomatopoeic, visual representations of sound. (Image source: Drucker, 1994, p. 136)

Figure 54: English version of Gomringer's *Schweigen* (the German word for Silence). The poem reads in any direction and though it clearly plays on the spatial dimension of text it does not turn into a graphic image in the way that visual poetry tends to do. (Image source: recreated by the author after the German version)

Figure 55: The *MSN* homepage shows a typical portal layout which exists to a large extent of text in the form of lists. These lists are not directly compiled by a human be-

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(Image source: screenshot from <http://www.msn.com>)

Figure 56: data-cloud by Chirag Mehta, representing the *State of the Union Address* made by George W. Bush on the 23.01.2007. This example shows the foresight of concrete poetry. This data-cloud resembles a generative text in which the spatial relationships of words and simple typographic distinctions reveal another level of meaning. (Image source: screenshot from <http://chir.ag/phernalia/preztags/>)

Figure 57: excerpts from a *del.icio.us* tag cloud. On first impression the tag cloud might seem like an impenetrable text space, a more or less random conglomeration of words. The opposite is true. The tag cloud is an expression of the user's interests. In some cases this can turn into a very detailed and even intimate character description. In this example, it turns out that among the most emphasized tags there are a lot of technology related words such as internet, design, programming, webdevelopment, webdesign, web2.0, technology, usability. Additionally, there is another area of high interest reflected in the tags marketing, business, management, productivity. The combination of tags indicates that this specific user is very much interested in issues relating to the development and management of internet applications. Many of the less connected tags hint at similar interests and support this interpretation. When it comes to more personal details, this user's data cloud is as descriptive: gaypolitics is one of the more prominent tags and surrounded by many other tags related to gay and gender issues. Environmental and green topics are also high on the list. The data cloud is more than just a navigation tool and it is even more than a dialogue between the user and the system, it is a reflection of certain aspects of the user's personality. And with the shift of personal interests and preferences over time, the tag cloud will also change its appearance. (Image source: screenshot from <http://del.ico.us>)

Figure 58: The social bookmarking site *del.icio.us* is using Arial as the basic typeface with each typographic differentiation serving a very specific purpose. For example, the saved by ... other people link only appears if other people on this social network have tagged the same link. As soon as a few more people have tagged this link, the background colour turns a slight pink. With increasing numbers of community members committing themselves to the same link, the background colour becomes a more intense pink with the blue of the text intensifying accordingly. Thus, the increase in col-

our intensity is to be read as an analogy to the increase of members of the community attached to the same link. But this does not only have a quantitative connotation. A link saved by many other people can be interpreted as a very popular link, a reassurance of ones own choice. Or, to the contrary, a link not yet posted by anyone else could be interpreted as having found a rare jewel. So the colour of the link is also a reflection of the user's position in this specific social network. (Image source: screenshot from <http://del.ico.us>)

Figure 59: Another very interesting aspect of computer generated texts such as tag clouds is that while they do not obviously move, they can shift massively over time. *Der Spiegel* for example, a German news platform, uses a tag cloud to show the importance of specific keywords according to their occurrence in the posted articles on the platform. The weight of the words changes with each new article posted and so the whole tag cloud can undergo massive shifts in the course of a few hours like in this example which shows the tag-cloud in its various states through the morning (left) at noon (middle) and in the afternoon (right). This provides another interesting link to concrete poetry which has intensely researched rule-based permutations of text (see figure 61). (Image source: screenshot from <http://www.spiegel.de>)

Figure 60: *kein fehler im system* (English: no error in the system), a strictly permutative poem by Gomringer. (Image source: Gomringer, 2001, p. 63)

Figure 61: Senders of spam email go to extreme lengths in order to conceal their actual intentions from spam filters while at the same time trying to remain decipherable by human beings. This advert for watches (most likely counterfeit) is obviously spam mail but security software is not able to detect the respective semantics behind the little crossword existing of watch brands. (Image source: screenshot from unsolicited email)

Figure 62: Another excerpt from a spam email wanting to sell drugs. In order to conceal its intentions from spam filters this text uses additional letter spacing and the offsetting of letters. Thus the text remains decipherable for analog human reading but remains undecipherable for discrete and rule based machine reading. This example again shows the foresight of concrete poetic experimentation which sensed that written language caught between man and machine would be faced with new kinds of challenges. (Image source: screenshot from unsolicited email)

Figure 63: A piece of Google art by Christophe Bruno called *Dreamlogs*. Bruno (<http://www.iterature.com/dreamlogs/faq.php>) describes the piece as follows:

‘Dreamlogs produce streams of idea associations on the Web. Starting from a discursive position you can for instance try to reach the opposite discursive position within a number of steps. To do so, choose a word or a piece of sentence as a starting point: "I love life", "I'm sad", etc. whatever you want (it works better with a simple one). When you press "Go", the program searches related text fragments among all the texts containing the input. Then choose another word or sentence among the texts displayed (by clicking on it) and reiterate the process. At the end, save your journey through the space of discourse and you will see the dreamlog that has been generated.’ The more or less random combination of text and images produced during this process appears like the subconscious flow created by a dream.
(Image source: screenshot from http://<www.iterature.com/dreamlogs/>)

Figure 64: Screenshots from Stewart Smith’s (2005) video clip to the song *Jed’s Other Poem* by the band Granddaddy. This piece is more than an ostensible play with animated type which one might find quite commonly in Flash animations. It is a shrewd comment on the relationship between text and code.
(Image source: screenshots from <http://www.stewdio.org/jed/>)

Figure 65: What looks like a result page from the Google image search is actually another piece by the designer Stewart Smith. In the explanation to this site, he explains that he was using a new service by Google called Google Portfolio to organize his online portfolio (Smith, 2007b). This new service would give the designer and artist the chance to simply pull together images and links relating to his work into the results of a Google image search. Smith later revealed that what seems like an elegant concept was actually a hoax. This project illustrates that contemporary web designers need a very detailed and intimate knowledge of how data are organized and how they flow through the Web. The project itself is no longer online.) (Image source: screenshot from <http://www.stewdio.org/index.html?project=googleshowcase>).

Figure 66: A screenshot of Ben Fry’s *Valence*. The designer (1999) writes about this work: ‘The image on this page is taken from a visualization of the contents of the book "The Innocents Abroad" by Mark Twain. The program reads the book in a linear fashion, dynamically adding each word into three-dimensional space. The more frequently particular words are found, they make their way towards the outside (so that they can be more easily seen), subsequently pushing less commonly used words to the center. Each time two words are found adjacent in the text, they experience a force of attraction that moves them closer together in the visual model. The result is a visualization

that changes over time as it responds to the data being fed to it. Instead of less useful numeric information (i.e. how many times the word 'the' appeared), the piece provides a qualitative feel for the perturbations in the data, in this case being the different types of words and language being used throughout the book.' (Image source: screenshot from <http://benfry.com/valence//applet/>)

Figure 67: Paley's *Code Profiles* is a cunning but at the same time subtle comment on the relationship between human readable text and code.
(Image source: screenshot from <http://artport.whitney.org/commissions/codedoc/Paley/CodeProfiles_800x600.htm>)

Figure 68: Digitally enhanced paper: An electronic pen identifies its position on a piece of paper via a printed irregular grid, turning paper into an interface for computing. (Image source: screenshot from http://www.Anoto.com)

Figure 69: *The Lost Cosmonaut*: a narrative environment based on digitally enhanced paper. Writing and drawing, in general touching the paper, makes the environment come alive. (Image source: author's photo)

Figure 70: *Partial Eclipse*, a multilinear story produced with *Korsakow*, a software for moving image database narrative. (Image source: author's photo)

Figure 71: Screenshot of one of several moving poetry projects done with the mind-mapping software *Personal Brain*. (Image source: author's photo)

1.0 INTRODUCTION

1.1 Preface

Could it be that hypertext, the medium that Nelson (1992) describes as a 'literary machine' is actually the end of text as we know it? Could it be that electronic writing and specifically hypertext networks, of which the World Wide Web is the most common form, might be undermining the alphabet in favour of new forms of writing? And could it be that this new writing form is one that merges text and image, fostering a new form of expression quite close to hieroglyphs? If such claims are realistic, it would not only have huge repercussions on the reader and the writer, but also the graphic designer, as the professional at the forefront of providing interfaces for information exchange, would be heavily involved in such a fundamental shift.

While this research investigates these claims in the context of the developments of the recent decade, the discussion reaches back further. In his seminal work, *Understanding Media*, Marshall McLuhan (1964, p. 12) pointed out that electronic media were about to evoke a 'return to the inclusive form of the icon'. Under the impression of the success of television, McLuhan was convinced that the predominantly alphabetic Western culture would shift towards visually richer forms of information representation such as image and icon. The German philosopher and art historian, Gottfried Boehm (1994, p. 13), indirectly supports McLuhan's claim when he observes an *iconic turn*[2] describing 'the return of images that is taking place on several levels since the 19th century'[3]. Boehm does not only refer to a mere shift in the way information is mediated. He recognizes an 'acceleration of the return of images into the philosophical argument'[4] (ibid, p. 15). In relation to McLuhan's discussion of media, the iconic turn actually means a slow abandoning of traditional text-based forms of writing and McLuhan also provides the culprit behind this change: electronic media.

At a time when the new up-and-coming electronic mass medium was TV, digital computers were still very expensive tools operated by experts. In the 1960s, interfacing with computers was mainly a question of command line typing and the idea that computing could turn into an image-based or iconic information interface was rather un-

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2 German original: 'Ikonische Wende'. See also chapter 1.2: Terminology

3 Translation by author. German original: 'Die Rückkehr der Bilder, die sich auf verschiedenen Ebenen seit dem 19. Jahrhundert vollzieht.'

4 Translation by author. German original: 'In der Geschichte des fortschreitenden 19. Jahrhunderts beschleunigte sich jedenfalls die Rückkehr der Bilder ins philosophische Argumentieren.'

common. Accordingly, the discussion regarding the iconic turn did not necessarily include computers until a later stage. The philosopher and critic, Susan Sontag, for example wrote in 1979 (p. 241) that 'today everything exists to end in a photograph'. Sontag's statement was made at a time when photo predominantly meant print. Even as late as 1998, Stephens, in his book with the telling title *The Rise of the Image, the Fall of the Word*, does not particularly recognize the computer as a driving force behind this sea change. He focuses strongly on the 'new video' (ibid, p. 215) referring to the creative and visual explosion caused by the new genre of music video in the 1980s and 1990s which was propagated mainly through TV on channels such as MTV or VIVA[5].

At the time of Stephen's publication though, the discussion about the iconic turn had already reached digital computing in general and the World Wide Web in particular. At first sight, this might seem rather counterintuitive as in technical terms the Web is a hypertext system thus claiming its origin from text. The media theorist Aarseth (1994) explains hypertext as 'merely a direct connection from one position in a text to another'. However simple this explanation might sound, digital hypertext has triggered a whole branch of theory called hypertext theory. This theory approaches the discussion of the iconic turn not so much on the basis of the observation of phenomena such as an increase of images or a decrease of text but through a philosophical discourse around the nature of text. Bolter (1991) and Landow' (1992) [6], two of the figureheads of this movement, argue that hypertext[7] relieves writing from the linear straightjacket of print:

> Hypertext fragments, disperses, or atomizes text in two related ways. First, by removing the linearity of print, it frees the individual passages from one ordering principle—sequence—and threatens to transform the text into chaos. Second, hypertext destroys the notion of a fixed unitary text. (Landow, 2006, p. 99)

In a second step, this dispersion of text into two-dimensional space leads to a form of writing that Bolter in his book *Writing Space* describes as topographic (Bolter, 2001, p. 36):

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5 A German equivalent to MTV

6 Bolter and Landow have both published the first editions of their books in 1991. Since then Landow has twice published reedited versions (1998, 2006) while Bolter has published one revised edition (2001). Rather than putting their first editions in perspective, both authors have underpinned their initial ideas, demonstrating that they consider their arguments still to be relevant. In order to underline the up-to-dateness of this discussion, this thesis will mostly quote from the most recent edition.

7 Bolter tends to talk in more general terms about 'electronic writing'.

> Topographic writing challenges the (logocentric) notion that writing should be merely the servant of spoken language. The writer and reader can create and examine structures on the computer screen that have no easy equivalent in speech.

Thus, topographic writing emphasizes the visual aspects of communication rather than the time bound narrative aspects of spoken language. Text would slowly shift from a representation of spoken language into a new and more iconic form of information display.

Both, Bolter and Landow base their ideas on a specific poststructuralist discourse that provides them with the basic two arguments against the linearity of the common printed text. The first argument is the idea of intertextuality.

> Jonathan Culler explained that "... literary works are to be considered not as autonomous entities, 'organic wholes,' but as intertextual constructs: sequences which have meaning in relation to other texts which they take up, cite, parody, refute or generally transform. A text can be read only in relation to other texts." (Bolter, 2001, p. 178)

Bolter's (ibid, pp. 177) and Landow's (2006, p. 59) theory is that hypertext, through its ability to interlink texts, is finally able to make this intertextuality visible, a feat which seems unachievable through the common linear printed text. The other reoccurring theme nourished by postructuralism is the idea that linear text does not represent human thinking structures. Just like any text is carried by a dispersed and endless meta-structure of all other texts, so human thinking is supposedly based on a huge decentral branching network of thoughts. Landow (2006, p. 59) quotes the philosophers Deleuze and Guattari:

> They [Deleuze and Guattari] propose a newer form of the book that might provide a truer, more efficient information technology, asking: "What takes place in a book composed instead of plateaus that communicate with one another across microfissures, as in a brain? We call a 'plateau' any multiplicity connected to other multiplicities by superficial underground stems in such a way as to form or extend a rhizome". Such a description, I should add, perfectly matches the way clus-

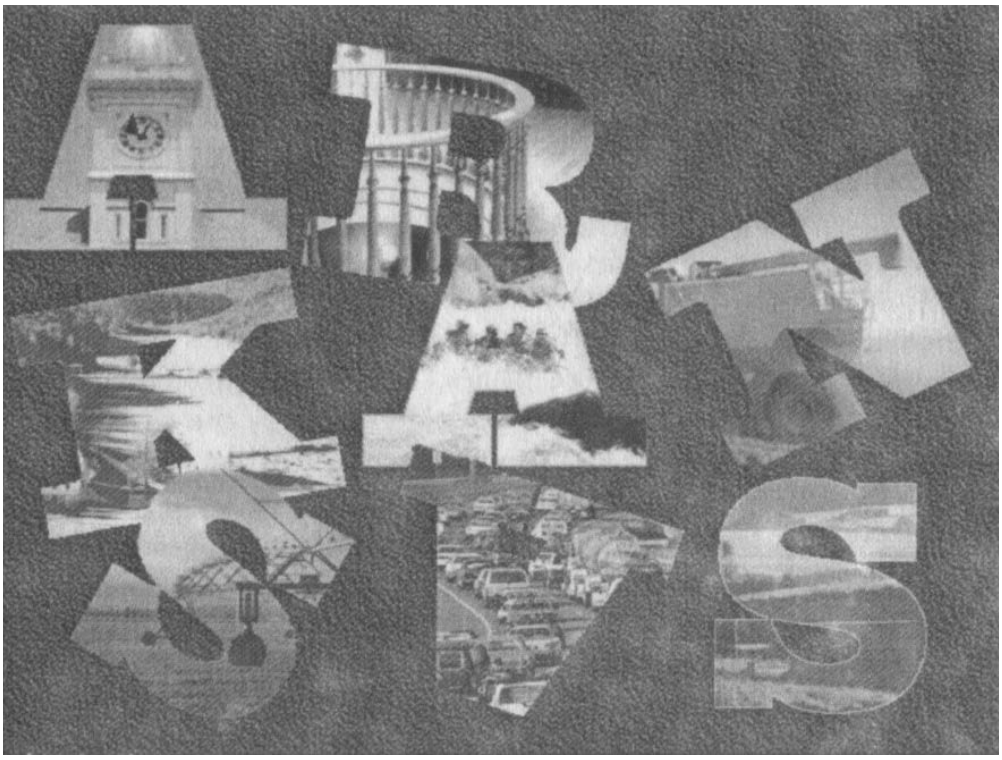
> ters or subwebs organize themselves in large networked hypertext environments, such as the World Wide Web.

But the story does not end with the dissolving of linear writing, the dispersion of text and a new form of topographic writing. Landow (2006, p. 84) thinks that 'hypertext… to some degree implements Derrida's call for a new form of hieroglyphic writing'. Even in its cautiousness, this statement is quite fundamental. Could it be that the iconic turn is not just a revival of the image but that it might present itself as challenge to alphabetic text as such, a full return to McLuhans 'inclusiveness of the icon' and that this movement is heralded by digital media? Bolter (2001, p. 37) suggests as much: 'Electronic writing seems in some ways to be more like hieroglyphics than it is like pure alphabetic writing'. If there remains any doubt as to where this argument leads, Glazier (2002)[8] in his *Digital Poetics*, says it out loud:

> If we consider the vast role the image has played in writing generally (cave paintings, Chinese writing, Egyptian hieroglyphic writing, Mayan glyphs), the codex era can be considered an aberrant period when text and image were temporarily isolated from one another. (p. 169)

The prediction of a marginalization or even demise of alphabetic text, a medium that has both formed and carried Western thinking for over 2000 years, is an extremely important and far reaching assertion, the implications of which cannot be underestimated. And the way in which it is argued that electronic writing is actually reinforcing this shift sounds quite coherent. But how does this sit alongside the fact that the Internet has seen a massive increase in text-based activities in the recent years through email, blogging, forums, chats, social networks and so forth (Broadbent, 2007)? To give just one example, in April 2007, Technorati counts about '75 million blogs' (Sifry, 2007) worldwide. The Web is not the only electronic medium that encourages writing. Mobile phone users send billions of text messages (Text it, 2007) when they could talk to each other through the same device. It is true that at the same time, the upload of moving and still image through platforms such as Flickr and YouTube has also increased massively. However, there is enough evidence to suggest that digital media are

[8] Even though Glazier comes to similar conclusions as for example Bolter, he does not argue from a hypertext theory perspective. For more details see chapter 2.



ure 1: ‘A splash screen for a multimedia presentation on Arkansas’ used by Bolter to emphasize the high impact of ‘writ- with images’ (Bolter, 2001, p. 72) which he sees as one of the main characteristics of digital media. (Image source: Bolter 01, p. 73)

fostering much more complex developments than just a 'return to the inclusive form of the icon'. As there seems to be some discrepancy between the aforementioned predictions, the main research question is this: from today's perspective, is there any evidence that such a strong iconic turn, supported by digital media and particularly by digital data networks such as the Internet, is taking place?

There is no doubt that the environment in which text and image reside is undergoing a dramatic change since the introduction of widespread computer and Internet access. But one of the main problems in the argument of Bolter, Landow and Glazier is that their references are not up-to-date even though their books, or rather their latest revised editions, have all been published since 2000. It will be shown that the visual examples used to support their points (see figures 1 and 44) as well as their general view on visual design practice do not take into account the developments of the recent years but refer to earlier development stages. Meanwhile, the emergence of the so called Web 2.0 (O'Reilly, 2005), describing the increasing involvement of users in – often text-based – communication via social networks has made it extremely easy for every user to produce web content, a lot of which is text. This new quality has not yet been reflected in the discussion regarding the iconic turn and digital media. Another point this thesis makes relates to the GUI – the graphic user interface – the predominant interface paradigm for personal computing. The desktop metaphor which includes the iconic display of folders, bins and all kinds of functionalities could well be seen as the prime example of a move towards visually rich forms of information display. It will be shown though that while the former *personal* and stand-alone computer is increasingly turning into a terminal for the Internet, surprisingly this shift brings with it a change in interface paradigm towards text-based interaction.

This thesis is not arguing against the image as a valuable communication device and not even against the iconic turn in the sense that image production has massively increased. This debate cannot be resolved by weighing the usage of image against the usage of text in some kind of measurable form. There is no measurable benchmark. It will nevertheless become very clear that the recent developments on the Web give no evidence of a strong iconic turn that marginalizes alphanumeric text or even pushes the written word towards iconic display. It will, to the contrary, be argued that digital media do prefer a strict separation of text and image. The reason for this is that computers can actually deal with alphanumeric text on a semantic level, which is still far more difficult with imagery. Electronic media, and specifically the Internet, are actually predisposed to the usage of digital and discrete codes such as the alphabet.

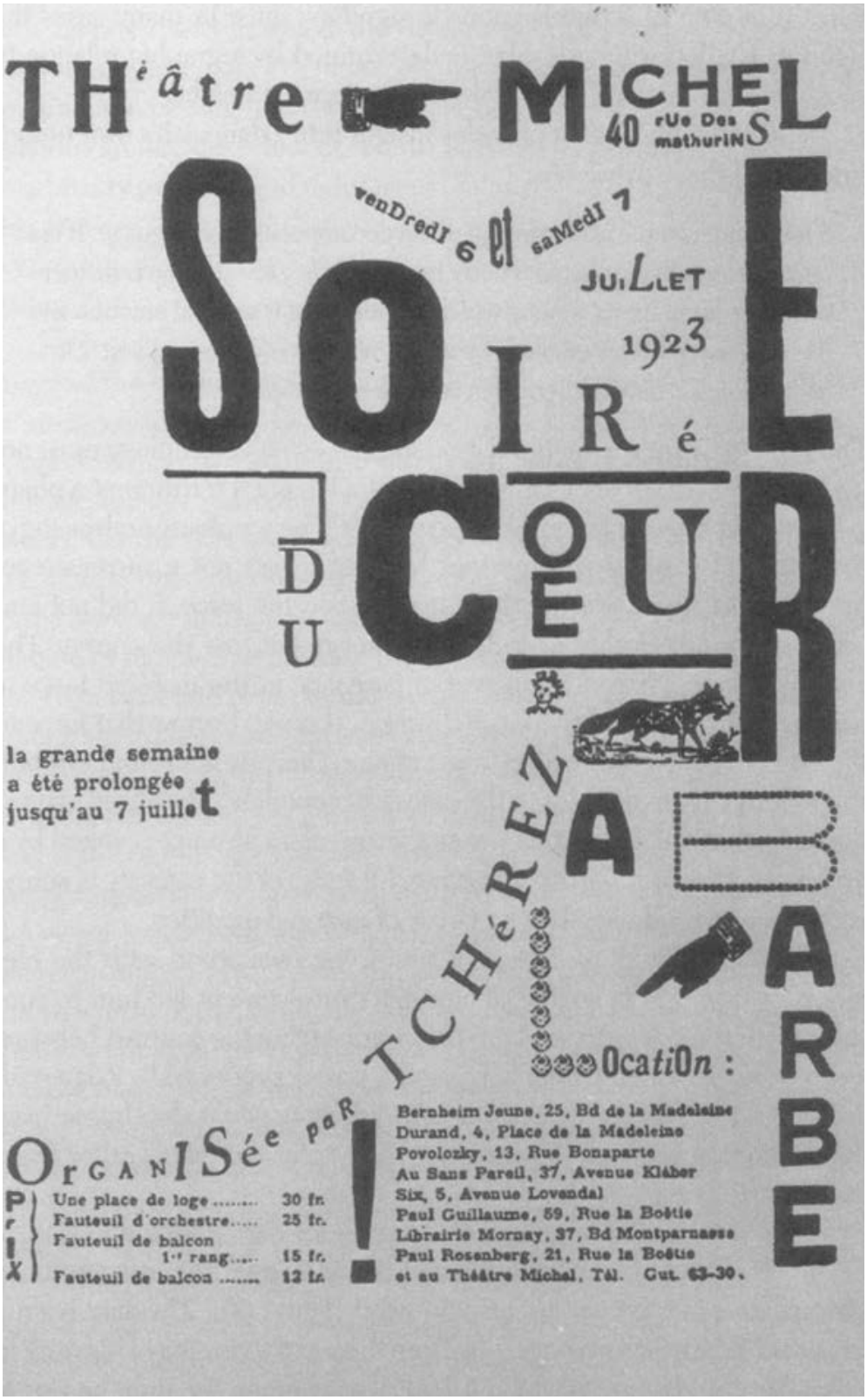
But if reality does not match the predictions of theory, which is one of the main points under discussion, it becomes necessary to scrutinize some of the theory as well as the premises under which it operates. Accordingly, this thesis discusses and questions the arguments brought forth in support of the digital turn in general, as well as regarding digital media and the Web in particular.

Thus, the first main target group of this thesis has been established. On a very specific level, this research answers to theorists such as McLuhan, Bolter, Landow and Glazier who in one way or another argue that the iconic turn is a movement that opposes itself to alphabetic text and that is particularly spurred on by electronic media. In more general terms this research hopes to add some very relevant arguments to the debate about the relevance of text and images in electronic media and how these two forms of information display relate.

This discussion does not simply concern itself with theoretical constructs though. Bolter, Glazier and Landow explicitly refer to what they consider as contemporary design practice in order to prove their point. Bolter (2001, p. 69), for example, mentions David Siegel's (1996) design manual for 'killer websites' and calls one of the most celebrated designers of the 1990s, David Carson[9], as his chief witness (ibid, pp. 51). The relationship between design practice and the discussion surrounding the iconic turn is obvious. It is graphic design that is concerned with information interfaces of all kinds and so the designer acts at the focal point of the discussion. Naturally, this makes the graphic designer the second target group of this research.

Whilst the whole discourse might be of general interest to the designer, as it provides some critical context, there are more specific issues which directly concern his profession. Graphic design only developed during the early 20th century but has since overseen huge aesthetic shifts in the design of both printed and digital matter. But what exactly is the role of the designer in those developments? Bolter (2001) and Drucker (1994) both argue that the iconic turn of the 20th century has partly been triggered by the visual poets of the avant-garde whose work has been later picked up by the new trade of graphic design:

[9] David Carson is a self-educated graphic designer and professional surfer. He first became famous for his typographic work with magazines like Beach Culture and Ray Gun, placed in the context of surf, skateboarding culture and rock music in the late 1980s, early 1990s. After his uncompromising deconstructive style had gained him some prominence he soon became the designer of the hour and worked for Newsweek, Nike, Microsoft and other major companies (Blackwell, 2000). See also chapter five.



ıre 2: *Soirée du Coeur à Barbe* by Ilia Zdanevich. Zdanevich is a proponent of Russian Futurism and thus, a representa- of the modernist avant-garde of the early twentieth century. His work is an example of the general tendency of visual tıry to push towards an iconic use of type. (Image source: Drucker, 1994, p. 190)

> The legacy of the avant-garde was a radical formal language, visually and verbally considered. The invention of design as a profession and as a discipline within the changed form of arts academies – Vhkutemas and Bauhaus in particular – permitted the formal aspects of the avant-garde experiments a setting designated by the conspicuously suggestive term "laboratory" for investigation, codification, and transformation. (Drucker, 1994, p. 242)

The graphic designer in this tradition (figure 2) is a visual experimenter, a visual artist increasingly eroding the borders between text and image. Bolter, by choosing Carson as a role model, subscribes to this notion of the artist designer. The question now is whether this concept reflects the new realities of design for digital media and particularly the Web. The truth is that such an approach is highly inaccurate. Whilst graphic designers still move between both domains, the role of the print designer cannot simply be transferred to digital media. The design of websites, for example, is split into various tasks, of which the visual aesthetics are merely one of many aspects to be considered. Could it be that the whole idea of the iconic turn in relation to digital media, as it presents itself in the writings of Bolter, Glazier and Blackwell, is actually based on the notion of print design? If that is the case, it is very questionable whether the visual poet, the painter with letters, provides the proper role model for the contemporary digital media designer. This thesis proposes an alternative. From the 1960s onwards, concrete poetry has experimented with so called text constellations as a form of experimentation with text in an information age. It will be shown that these experiments not only contain some interesting and accurate predictions about the status of text in the early digital age, but that they also provide amazing insights into how design for digital media approaches its material. Thus, this thesis sets out to provide some guidance with regards to a growing new self-concept of the designer in the context of digital media.

1.2 Terminology

While most technical terms and abbreviations will be explained on the fly, a few central terms will now briefly be discussed in terms of how and why they are used in the context of this thesis:

The term *iconic turn* was suggested by Gottfried Boehm in 1994 (p. 13) in the introductory chapter to the book *Was ist ein Bild?* (English: What is an image?). It de-

scribes what he sees as a 'return of the image' in many domains, but particularly in philosophical discourse, which is the field he is addressing. In the context of this research the term will be used in a rather neutral way to describe an increase of imagery in contemporary media. Furthermore, the term *strong iconic turn* will be suggested to describe the notion that the iconic turn initiates a shift in favour of image-writing that will ultimately be directed against alphabetic writing. One should also note that the term itself is not referred to in the main English sources this thesis is concerned with[10].

The difference between text and image is not as obvious as it might seem. Landow (2006, pp. 85) for example talks about 'visual elements of text':

> Even printed text without explicitly visual supplementary materials already contains a good bit of visual information in addition to alphanumeric code. The visual components of writing and print technology include spacing between words, paragraphing, changes of type style and font size, formatting to indicate passages quoted from other works, assigning specific locations on the individual page or at the end of sections or of the entire document to indicate reference materials (foot notes and endnotes).

While the noun *visual* can denote a 'visual image or display, a picture' ('visual', 1996, *The Oxford English Reference Dictionary,* second edition), the adjective *visual* implies that something is physically visible in the first place (ibid). Accordingly, Landow's usage of the word is slightly unfortunate in this context as it seems to suggest that alphabetic text is not a visual element. There is a similar ambiguity when Kirschenbaum (2003, p. 137) talks about a 'broadband cultural shift to the visible spectrums of language'. It should be clear that text is a visual element of language. But does this common property of being visual imply that text and image are the same in the line of 'the word is an image after all' (Moulthrop cited in Kirschenbaum, 2003, p. 137)? The image, according to The Oxford English Reference Dictionary (1996, second edition), is a 'representation of the external form of a person or thing'. Likewise, the picture is 'a visual representation of something, such as a person or scene, produced on a surface' ('picture', 1992, *Collins English Dictionary*, third edition).

[10] It is ironic that the German Wikipedia (<http://www.wikipedia.de>) lists the English term *iconic turn*, while the English version (<http://www.wikipedia.com>) does not (status of 16 Februray 2008). (It should be mentioned that Wikipedia in this case is only used to highlight a certain usage of language and not as a source for backing up the argument).

In the light of these definitions the picture or image and the alphabetic text are the same only in the sense that they are marks on a surface. The differences between both are bigger by far. While the image tries to resemble properties of things and objects in the visual world, phonetic writing is an annotation system for sound (Illich & Sanders, 1989, pp.7). The image is always an abstraction[11] in the original sense of the word[12], in that it retains some properties of the original while disposing of others. Text as notation system, strictly speaking, is not an abstraction but a translation. Text translates an auditory sensation into a visual sensation. That is to say that language and writing nevertheless will further be described as abstract in the sense of 'not trying to depict a representation of external reality' ('abstract', 1996, *The Oxford English Reference Dictionary*, second edition). Pictures and images have what Peirce (1932) calls 'iconic quality'. They visually resemble what they stand for whereas the relationship between letters and what they represent is totally arbitrary. This is aside from the fact that the Web as a medium makes a fundamental technological difference between text and image (Kirschenbaum, 2003) as will be discussed in chapters five and six.

The discussion of the term *text* is similarly laced with ambiguity. The Oxford English Reference Dictionary (1996, second edition) explicitly makes a distinction between the text as 'the main body of a book' on one side and other content such as pictures on the other side. Nobody would deny that the hieroglyphs on an obelisk represent a text as well as they represent writing. Glazier (2002, p. 169) is actually predicting that post-alphabetic writing will emerge from digital media as a return of some sort of hieroglyphic writing style. Thus, it makes sense to define text and writing more precisely. Wherever needed, the terms *text* and *writing* will be used in connection with the attribute alphabetic in order to distinguish them from hieroglyphic or picture writing. Whenever the phrase *text and image* is used in this thesis, it implies a certain contrast and antagonism and thus, text in this context is used as a synonym for alphabetic writing.

As some of the terms describing the technological backdrop of this thesis overlap each other it makes sense to briefly distinguish them from one another, even though most of them will be explained in more detail later. The Internet and the Web, for example, are sometimes wrongly used as synonyms. However, while the Internet in general stands for an international network of computers ('Internet', 1996, *The Oxford English Reference Dictionary*, second edition), the Web or more precisely, the World

[11] Even the photo is an abstraction as it abstracts a three-dimensional scene onto a two-dimensional surface.

[12] abstrahere (Lat.) = drag away from

Wide Web, is simply one service offered through the Internet. Other services are, for example, email or newsgroups. While the Internet is basically the hardware and software that provides the technological infrastructure, the specific services define a certain form of information exchange and display. The Web is an Internet service which organises information in the form of hypertext. *Hypertext* generally stands for 'a direct connection from one position in a text to another' (Aarseth, 1994, p. 67) and will be explained in more detail in chapter three. Aarseth (ibid, p. 68) and Glazier (2002, p. 86) though rightly point out that the Web is simply one possible implementation of hypertext. Like hypertext (Nelson, 1965), the term *docuverse* was coined by Ted Nelson (1992, 4/15). It describes, as Winkler (1997, pp. 9) states, 'the universe of machine readable documents, programmes and projects which is based on its very own technical, social and institutional rules'[13].

It is worth pointing out that the masculine pronoun *he* is preferred throughout when referring to a general person. The alternative would be the usage of the pronoun *she* as preferred by some writers. As such a usage of pronouns is still an exception rather than the rule in English writing, it inevitably highlights issues of gender equality. This thesis though, is not a platform for such a discussion.

1.3 Chapter Overview

The first two content chapters, two and three, will serve two aims. First of all, it must be explained where the discussion about the iconic turn regarding digital media comes from and what its positions are. Secondly, the theoretical background that supports these ideas will be scrutinized, and it will be considered whether it is coherent or whether there are both historical and theoretical gaps.

McLuhan describes the iconic turn as a *re*-turn, a backwards movement. This implies that there is a historical case to be made that alphanumeric writing was preceded by image writing and that it actually represents an 'aberrant period' as Glazier (2002, p. 169) points out. Chapter two sets out to investigate this claim that alphabetic text is simply a historical curiosity and interlude amidst a world that is actually best described in iconic terms. How and why did humanity move from spoken language to the use of images and text and in which order did this passage precede? There is evi-

[13] Translation by author. German original: 'Der Begriff *Docuverse* hält die Tatsache fest, daß ein Universum der maschinenlesbaren Dokumente, Programme und Projekte entstanden ist, das technisch, gesellschaftlich und institutionell eigenen Regeln und eigenen medialen Gesetzmäßigkeiten folgt.'

dence, such as the research by Schmandt-Besserat (2006), that alphabetic writing developed as a highly abstract form of symbolic representation and not necessarily through a soft shift from writing with images.

She, similar to Hobart and Schiffman (1998), also argues, that writing was not developed for the purpose of narrative in the first place. This contradicts Bolter (2001) and Landow (2006) to whom text, whether iconic or alphabetic, is a narrative device. Their whole argument is based on the idea that the written word is simply a transcript of the spoken word and thus narrative, linear and time-bound by nature. They further argue that a linear text is not properly equipped to express the fact that any text is an intertextual construct built on earlier writings. However, Bolter and Landow believe that the inability of the alphabetic text to deal with this has now been overcome by hypertext. The consequence, they assume, is that this new form of text pushes alphabetic text out of its linear trail and into topographic space:

> Hypertext fragments, disperses, or atomizes text in two related ways. First, by removing the linearity of print, it frees the individual passages from one ordering principle—sequence—and threatens to transform the text into chaos. Second, hypertext destroys the notion of a fixed unitary text. Considering the "entire" text in relation to its component parts produces the first form of fragmentation; considering it in relation to its variant readings and versions produces the second. (Landow, 2006, p. 99)

This whole theoretical construct is slightly endangered to say the least if the development of alphabetic text is not based on narration in the first place. Aarseth has (1997) previously reputed the notion of linear prose versus multi-linear hypertext. He argues that prose on printed matter allows for instant access to any part of the text while hypertext is highly selective. What emerges from this is a different perspective on text. To Aarseth (ibid), text is a material that has very specific qualities according to which it can be formed and arranged and narrative is just one possible form. Glazier (2002) similarly argues the case of text as material but in his case he does that from the position of a poet to whom the formal aesthetic aspects of language naturally come before notions of narrativity. This concept of text as a material goes beyond the rather restrictive description of alphabetic writing as a narrative device and it will later help to illuminate how text can be utilized in the context of digital media.

While Chapter two looks at the text, its structure and its relationship to the image, chapter three will examine the reader and his mind. Writers like McLuhan, Bolter, Landow and Glazier, draw a lot from cultural history in order to define the relationship between image and text. Another important scientific field, though, is largely absent from the discussion: cognitive science. What does human cognitive science have to add to this discourse that could give it a new perspective? Previous arguments brought forth in favour of iconic display often praise its immediacy (Bolter, 2001, p. 59), which means instant access to the information by a direct reflection of the visual world:

> Why do we assume there is more truth inside us than out? Why is there not as much to be learned by picking apart, rethinking, reimaging our surfaces—from a superficial analysis—as there is from an analysis of those mythical insides? Perhaps we have gained what we can gain from this metaphor. Perhaps it is time for it to be dropped, time for our gaze—with all the powers of the new video—to return to what can actually be seen. (Stephens, 1998, p.215)

In this sense, images are established as an objective description of the world that resides outside the human being, while language and text – abstract constructs of human thought – reside inside the human mind. What Stephens and others, who advocate an iconic turn at the expense of alphanumeric text, imply with such notions, is that abstract language and text are negligible factors when it comes to mediating the world that exists outside and independent of us.

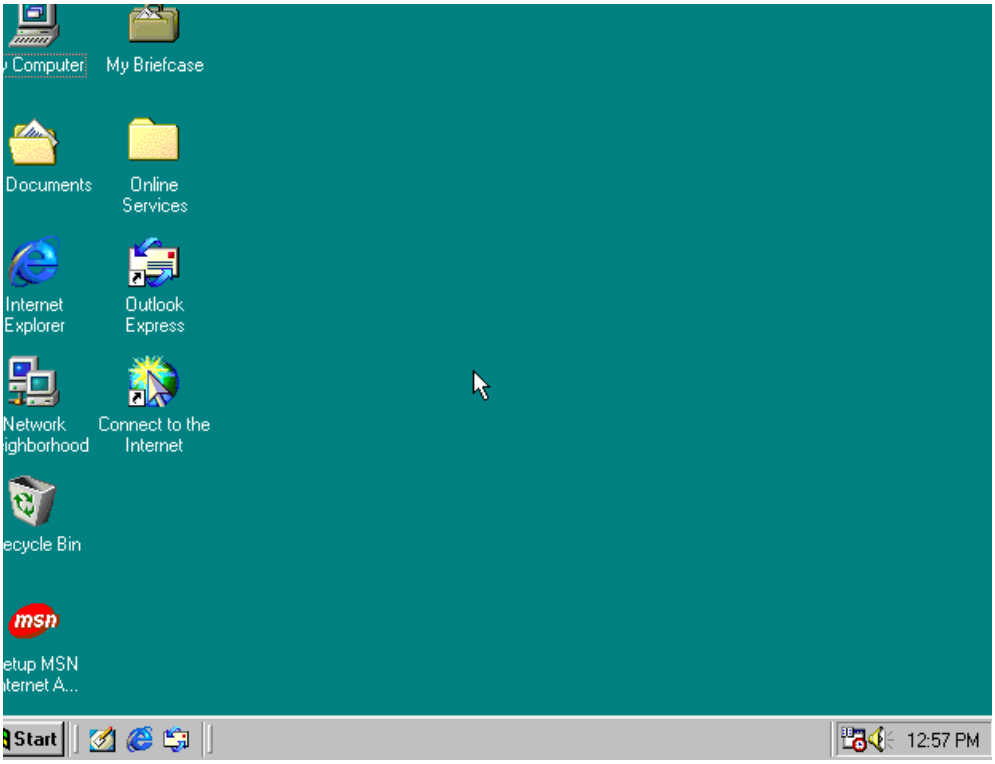
The work of cognitive scientists Maturana and Varela (1987), Gibson (1966, 1979) and Damasio (1995) shows that such a view is misguided. Perceiving the environment is not about receiving images via the visual apparatus. Seeing, the inner image so to say, is not a reflection of the world but a way in which the human body utilizes and handles specific wavelengths of light. 'When you see, you do not just see: you feel you are seeing something with your eyes' (Damasio, 1995, p. 232). In this sense seeing produces the world rather than reflecting it. And language is not a descriptive tool either that simply gives abstract names to qualities and properties inherent to the world perceived via images. Lakoff (1987) and Lakoff and Johnson (1980) show that language is a process in which basic physical experiences are named and those descriptions are then extended to other more abstract concepts through metaphorical transfer. Human categorizations and descriptions of the world are not objective

descriptions of realities but a way to construct the world. In other words: complex concepts are first metaphorically imagined and then named. This is an iterative process through which language evolves.

Consequently, it is difficult to imagine that a complex understanding of the world can exist without language and it will be shown that for this reason iconographic writing disconnected from spoken language is not a very effective form of communication. In this line DeFrancis (1984, p. 144) points out that any workable writing system is actually by nature phonetic and not iconographic. The blueprint for text is spoken language and not the image. Text emphasizes the regularities of language as a code. It turns rich variations of sounds into a few symbols and thus gives information a discrete form. Text turns language into a system that provides regular patterns which support both human understanding and computing.

The evidence from cognitive science brought into the discussion throughout this chapter shows that despite all the arguments made in favor of image writing, its ability to form complex writing systems is very limited. On the other hand, the evidence emphasizes the abilities of alphanbetic code as an elegant communication tool far from being obsolete. But why this frustration with what is seen as linear text in the first place? The German media theorist Winkler (1997) argues very coherently that the hope surrounding hypertext and its ability to lay open intertextuality is actually a very metaphysical hope in that it suggests that the text gains the ability to reveal its content to the reader without the reader having to go through the process of making meaning. It will be shown that such hopes are actually spread well beyond hypertext theory as they constitute a reaction to the increasing information overload produced by the ever increasing speed of text production.

The aim of chapters two and three is to rebut the general theoretical underpinnings of a strong iconic turn. These chapters particularly object to the notions that hypertext and with it, the Web, acts as a step towards Derrida's vision of a new form of hieroglyphic writing. Chapters four and five will take the arguments that have been made so far and place them into the context of design practice. This is necessary because Bolter, Glazier and Landow repeatedly refer to design practice in order to make their points. Bolter, for example, thinks that contemporary graphic design helps to lay open a natural tendency towards the iconic inherent in the written word: 'Words no longer seem to carry conviction without the reappearance as a picture of the imagery that was latent in them' (2001, p. 54).



ıre 3: Screenshot of a standard operating system with a graphic user interface (in this case *Microsoft Windows 98*). Is form of iconic interaction evidence of a more general iconic turn through which text is replaced by images and icons? age source: <http://www.guidebookgallery.org>)

Hypertext and the Web though, are not the starting point for this discussion. It is worth looking at computer interface design in more general terms in order to understand which roles text and image play in this context. Accordingly, chapter four provides a short overview of the beginnings of interface design in which text-based communication was the dominant form of interaction. This then leads to the actual case study which is an analysis of the current *graphic user interface* or *GUI* (figure 3).

The main two elements of the GUI relevant for this thesis are the desktop metaphor and the embedding of functionalities into icons. The interface paradigm represented by desktop and icon could be seen as the living example of how computing tends and drifts towards writing with images. Bolter suggests as much (Bolter, 2001, p. 62): 'we can see the eclectic and animated qualities of the computer's picture writing in the now familiar desktop GUI.' This approach to interface design, as ubiquitous as it has become, is not without its critics. Ted Nelson, who coined the term hypertext (1965) and who set up one of the first hypertext systems, is one of its harshest opponents: 'A tedious array of icons is supported by the new Metaphoric Ideology[14]... Let us consider the "desktop metaphor," that opening screen jumble that is widely thought at the present time to be useful' (1990, pp. 236). Others, such as Nardi and Zarmer (1990), Kay (1990) and Raskin (2000), have brought forth some well founded objections. The main tenor of the criticism is that the metaphor and the iconic approach to interaction support easy learning in the beginning but in the long term they undermine the possibilities of interaction with computers.

While one might argue that current practice proves the critics of the GUI wrong, chapter four, to the contrary, shows that in the recent years the GUI has come under increasing pressure. This is due to the fact that the *personal* computer has over the years slowly shifted towards a *network* computer. Landow, Bolter and Glazier do not make any differences between the various forms of digital media. They do not recognize that stand-alone applications such as CD-ROMs or kiosk systems work under fundamentally different premises than a text embedded in a network. Nowadays, more and more computers are permanently or even predominantly online and more and more information is sourced out into the Web or generated online in the first place. Whilst the personal computer turns into a terminal for a huge network, it has to deal with a totally different information environment than if it were to remain a stand alone solution. The main argument of this chapter is that the traditional desktop met-

[14] Nelson refers to the idea that real world concepts such as the desktop and the office are used as metaphors and interfaces for complex interactive system such as the personal computer. (See chapter 4)

aphor and the iconic display of information are increasingly problematic as a means of delivering in the face of these changes. The Web is organised around metaphors of movement[15] whilst the PC organizes its information according to spatial metaphors. However, the sheer mass of information on the Internet can simply not be managed with browsing through spatial representations such as folders and hierarchies. It has to be organised semantically on the basis of alphanumeric text. For the moment, the user has to deal with these two interface paradigms in parallel. This chapter gives evidence though, that there is reason to believe that a shift is taking place towards semantic data organisation, thus undermining the relevance of the desktop metaphor.

Chapter five provides the second case study which deals with the current state of web design and the role of the designer. It is, however, necessary to start on a more general level. This is because some theorists seem to have found a certain continuity of design style that carries over from print design. Bolter's (2001) chief witness in this respect is David Carson, one of the most renowned print graphic designers of the 1990s. Carson investigates the visual properties of text by deconstructing it, taking it apart and thus tending to render it almost unreadable in this process (figure 4). Kirschenbaum (2000) refers to his work as 'post-alphabetic' while Blackwell's (2000) Carson retrospective proclaims 'the end of print'. The bottom line though is that Carson's work is also supposed to define the visual possibilities of the new digital age (ibid). Both Bolter and Glazier, underline this by giving examples of what they think is contemporary digital design practice which reflects 'the most significant strengths of new media writing to reunite the text with the image (Glazier, 2002, p. 169)'.

One of the problems with this argument is that these two authors refer to visual examples from 1997 even though Glazier's work stems from 2002 and Bolter's latest edition from 2001. These designs are more than ten years old and it will be clearly explained that the examples brought forward are not representative of the recent developments in digital writing, particularly not when it comes to the Web. It might as well be that Carson's work defines the end of print but chapter five shows that his design does not allow for any general conclusions in regards to the aesthetics of digital networked media. What has not been recognized in this debate so far is that contrary to what Bolter and Glazier argue, digital media and the Web in particular, foster and pre-

[15] Negroponte (1995, p. 183) for example talks about an *Information Superhighway*.

ıre 4: *Jeff Booth*, a design by David Carson which illustrates his deconstructive approach towards typography. Carson ls to emphasise the formal, aesthetic aspects of text and thus, often detaches it from the semantics represented by the ers. Additionally Carson tends to blend imagery and typeface which further shifts the typographic symbol towards an ıic representation. (Image source: Blackwell, 2000)

fer a clear division between text and image and not a union. As an example, chapter five demonstrates how the Guardian website has seen an increasing separation of text and image over various redesigns.

Due to these fundamental differences it is too simplistic to treat design for the Web as a continuation from design for print. This was nevertheless a common notion among early web designers, of which Siegel's bestselling book *Creating Killer Websites* gives evidence: 'Designers want to make web pages with the same degree of control they have over paper' (Siegel, 1996, p. 21). Meanwhile, web design is a highly specialised profession and the actual design of a web application is sometimes shared amongst four roles: programmer, information architect, graphic designer and usability expert. All of these have a direct or indirect influence on the visual display of information in the context of a website.

The evidence collected in this chapter demonstrates the weakness of a position which argues from the state of the Web and web design as it presented itself in the mid 1990s. It is not as Glazier (2002, p. 86) suggests that those years were 'a period crucial in the development of Web conventions'. With hindsight it can be said that those conventions were an early day phenomenon and web design has moved on since to a far more sophisticated structure organised on text-based semantics and on the basis of a clear division between text and image.

To summarise, the whole discourse about the iconic turn in digital media as well as the resulting discussion of the role of the graphic designer are an attempt to understand the current aesthetics of digital media. The understanding of complex ideas must necessarily be conveyed in the form of metaphors, or analogies and metonymies[16] for that matter, as chapter three explains in detail. Accordingly the final content chapter, chapter six, will provide an analogy that tries to capture the role of the current digital media designer and with it the forms of creative and aesthetic expression that digital media offer. This is to provide a different and better understanding of the role of the designer and digital aesthetics.

The concept of the designer which Bolter offers also implies an analogy which is represented by David Carson whom he describes as a role model for the designer of the digital age. He sees him operating in the tradition of the visual poets of the early 20th century:

[16] The difference between these tropes will be explained in chapter 3, footnote 53. What all these tropes have in common, is that they work by transferring meaning from one term to another.

> For Carson, words should be seen and not just (or not even?) read. The historian and designer Johanna Drucker (1994) has shown how words were treated pictorially in modern art and graphic design from the beginning of the century: among those practicing collage and photomontage, among the futurists, dadaists, and lettrists, and so on. The treatment of text as image becomes even more popular and more culturally compelling with the rise of digital media, because of the ease with which images and words can be combined. (Bolter, 2001, p.52)

The avant-garde of the early 20th century, among them the visual poets of various *isms* was a heavily influential inspiration to the first generation of graphic designers (Drucker, 1994, pp. 240). Kirschenbaum (2003, p. 137) describes their work as 'the beginnings of broadband cultural shift to the visible spectrums of language'. Even though this is the avant-garde of the modern age, some of its protagonists were still operating in the tradition of the romantic artist: their work was often an expression of the individual self as much as it was an examination of the material quality of text. To model the contemporary digital designer in the tradition of the avant-garde and graphic designers such as David Carson establishes the graphic designer as a painter with words, an artistic, self-expressive genius.

This thesis offers a different analogy for understanding the designer's role even though it relates to poetry as well. Glazier (2002) rightly points out that poetry offers an alternative understanding of text compared to the simplistic notion of a linear time-bound transcription of spoken prose. Poetry is always at least as much about the material and aesthetic qualities of language and text as it is about a temporal succession of words and thus, Glazier (ibid, p. 26) suggests that poetry is actually the right way to address digital writing:

> Innovative poetic practice has investigated both materiality and the conditional dynamics of writing. Indeed, it is important to note that digital poetries are not print poetry merely repositioned in the new medium. Instead, e-poetries extend the investigations of innovative practice as it occurred in print media, making possible the continuation of lines of inquiry that could not be fulfilled in that medium.

Figure 5: A concrete poem by Max Bense. Other than visual poetry and deconstructive graphic design, concrete poetry is more interested in the letter as a signifier, rather than as an iconic graphic representation. In this context, concrete poetry experiments with the relationship between spatial organization of text and its semantics.
(Image source: Gomringer, 2001, p. 25)

Aarseth (1997) similarly highlights the importance of the material qualities of text in his concept of ergodic[17] literature. In the same sense, concrete poetry of the 1950s and 1960s offers an alternative model of visual poetry quite different to the expressive painting with words the avant-garde indulged in. Concrete poetry is a very subtle visual exploration of the relationships between words and space that does not try to turn text into an image (figure 5). The concrete poet and theorist Gomringer (1996, pp. 150) explains that concrete poetry produces 'constellations and not images'.

> The constellation is the simplest possible kind of configuration in poetry which has for its basic unit the word, it encloses a group of words as if it were drawing stars together to form a cluster. (Gomringer, 1954)[18]

Concrete poetry understands itself as an exploration of the textual condition of the information age (Gomringer, 1954). Looking at concrete poetry from today's perspective one finds some astonishing parallels between how these poets constructed their text constellations and how information is presented and organized on the Web (figure 6). The so called Web 2.0 (O'Reilly, 2005), a synonym for the recent shift of the Web towards a social networking platform, offers particular interesting examples of complex text constellations such as data clouds. But the organization of text in space is not the only concern of concrete poetry. Some of the work explores the effects of programming on text which, for example, results in so called permutative poems (figure 60) where the text progresses on the basis of predefined rules. Today's web design shares a lot of common ground with those experiments. Web design today is not about a merger of text and image or about a shift of the image towards more expressive forms of display. It is not about visual statements but about complex and sensitive constellations of data. It is about a constant recombination of data, an ever-changing

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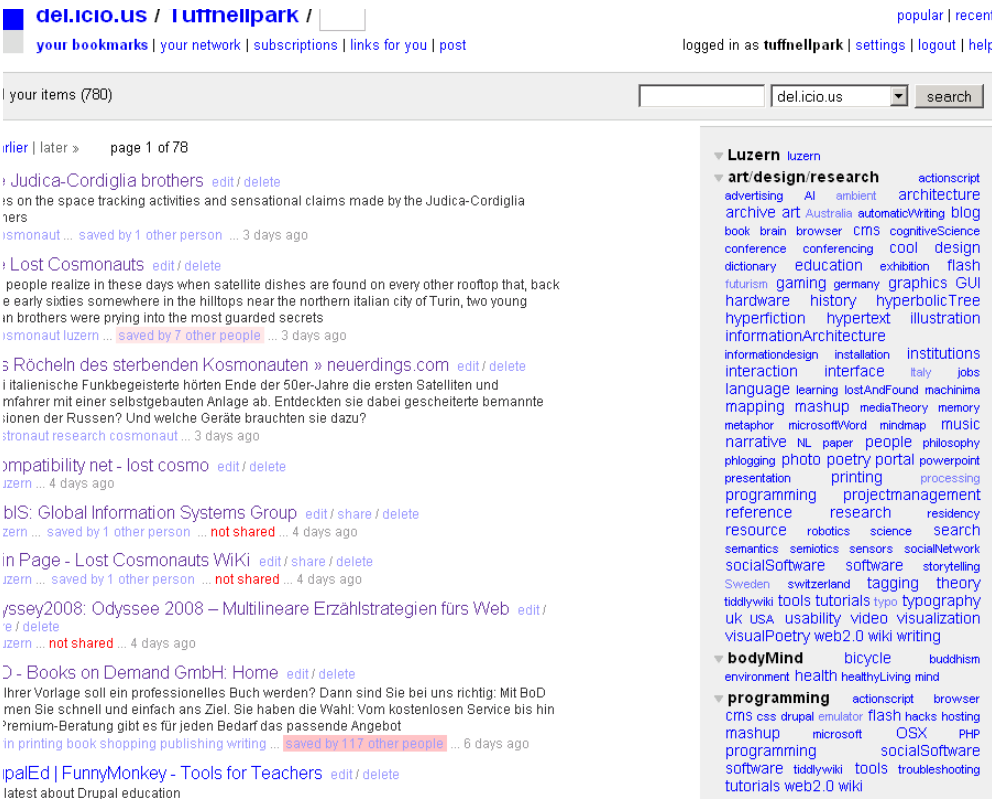
17 Aarseth, describes the concept of ergodic in the context of writing as follows:
'During the cybertextual process, the user will have effectuated a semiotic sequence, and this selective movement is a work of physical construction that the various concepts of "reading" do not account for. This phenomenon I call ergodic, using a term appropriated from physics that derives from the Greek words ergon and hodos, meaning "work" and "path". In ergodic literature, nontrivial effort is required to allow the reader to traverse the text.' (1997, p. 1)
And further on:
'The adjective I propose for this function is ergodic, which implies a situation in which a chain of events (a path, a sequence of actions, etc.) has been produced by the nontrivial efforts of one or more individuals or mechanisms.' (ibid, p. 94)

18 Original in German. Translation from <http://www.ubu.com/papers/gomringer01.html>



ıre 6: *Del.icio.us* is a so called social bookmarking website, where users do not only store their own bookmarks, but also re them with others. Each bookmark is heavily supported through textual descriptions and markers. Additionally, se-ıtic relationships are often expressed through very subtle variations in type size or color. The listing to the right is a so-ed data cloud. (Image source: screenshot from <http://del.icio.us>)

kaleidoscope of varying views on databases (figure 6). Accordingly, it seems highly appropriate to suggest that concrete poetry is the model for understanding the aesthetics of contemporary Web design as well as the creative challenges faced by the Web designer. Chapter six underlines this argument further with examples of the work of practitioners, such as Christophe Bruno, Stewart Smith, Ben Frey and Bradford Paley. Each in their own way show how digital media and particularly the Web are organized around text-based semantics and how these texts can be reorganized, manipulated and reinterpreted with the help of computing. It will be suggested that the new breed of designers and media artists who, in the recent years, have started to unleash the new potential of digital media networks, is half writer, half engineer or maybe better, a poetic engineer of data, just like the concrete poet.

1.4 Literature review

The concept of an iconic turn is a reoccurring theme in the theory towards the end of the 20th century. Jay David Bolter (2001, pp. 47) in his work *Writing Space*, for example, calls for the support of the theorists Thomas Mitchell and Frederic Jameson to make the point that 'we are living in a visual culture'; one that is moving away from text towards the image. The philosopher Susan Sontag (1979) in *On Photography* observes the obsession with which post Second World War society captures and freezes every moment, every object and every person in photographic imagery. Of greater interest in this context, though, are the slightly earlier comments of McLuhan. The philosopher and professor for English literature, Marshall McLuhan, whose defining works *The Gutenberg Galaxy* (1962) and *Understanding Media* (1964) were published in the 1960s, was one of the most influential media theorists of the 20th century. McLuhan's strong, but often slightly cryptic views covering the whole media landscape, are not endorsed by everyone. They have indeed attracted a lot of criticism (see chapter five) but nevertheless his writings have become such landmarks of media theory that he can be hardly ignored. McLuhan (1964, p. 84) definitely acknowledges the importance of the written word when he suggests that the alphabet is responsible for 'creating "civilized man"'. The success of television and the increasing usage of digital computers in the decade after the Second World War though made him sensitive to the potential of electronic media to influence society and even the way humanity communicates. Hence the following remark:

> When electric speed further takes over from mechanical movie sequences, the lines of force in structures and in media become loud and clear. We return to the inclusive form of the icon. (1964, p. 12)

McLuhan's theory in this respect is only a starting point because he is not elaborating further on the idea of an iconic turn and he could during his days not possibly imagine which direction computing would take. This quote is of enormous relevance though as it highlights a connection between the idea of an iconic turn and electronic media, which is the main topic of this thesis. More general issues regarding the iconic turn are addressed as well, such as, for example, the pros and cons of iconographic writing or the cultural history of writing in order to assure that the argument is sitting on a sound foundation. However, the wider focus is on issues regarding the iconic turn that fall into the domain of electronic media.

The final focus of this research emerges from theory that talks in more general terms about electronic writing but strongly tends to situate this form of practice within the context of the World Wide Web and its underlying structure, hypertext. This thesis identifies three main authors in this respect, all of whom in one way or another are academics related to literature: Jay David Bolter is a computer scientist but also a professor for literature, George P. Landow is a professor for English as is Loss Pequeño Glazier. It is not surprising then that their books are actually related to digital media as a writing tool. Bolter (2001) in his *Writing Space* and Landow (2006) in *Hypertext* have a fairly similar starting point and their arguments do overlap in various ways. They are both concentrating on the idea of hypertext as a new form of writing and also both argue within poststructuralist tradition. Hypertext, the new electronic form of writing that interlinks a virtually endless amount of texts, is seen as a way of refinement of the written word away from sequential and linear flow of time towards the non-hierarchical, rhizomatic and networked structure of human thought as proposed by Deleuze and Guattari (1988).

> Like the rhizome, hypertext, which has "multiple entryways and exits," embodies something closer to anarchy than to hierarchy, and it "connects any point to any other point," often joining fundamentally different kinds of information and often violating what we understand to be both discrete print texts and discrete genres and modes. (Landow, 2006, pp. 58)

What happens visually during this shift from the book to hypertext according to both Bolter and Landow is that text turns from a one-directional flow of letters into a spatial arrangement. This spatial arrangement then supposedly encourages the inclusion of 'a far higher percentage of nonverbal information than does print' (ibid, p. 84). Accordingly, hypertext slowly shifts towards something resembling 'hieroglyphic writing' (ibid, p. 84) or 'picture writing' (Bolter, 2001, pp. 59). While neither of these authors declares this form of the iconic turn to be the end of alphabetic writing, they both indicate that the increasing mix of text and imagery is an ongoing process with no foreseeable end. Glazier (2002) in his *Digital Poetics* disagrees with Bolter's and Landow's outlook which equates the term text with prose. He argues that digital text is by its nature closer to poetry. However, he joins their conclusion when he argues that electronic text favours spatial before sequential arrangement and more directly than Bolter and Landow he puts into words that this could mean the end of alphabetic text in its current form (2002, p. 169).

The great achievement of Bolter and Landow is certainly that they were among the first to understand the huge impact hypertext would have on the whole of western writing culture and to start a debate at a time, in the early 1990s, when this technology was still a toy for a few insiders. Glazier added to the whole discourse by pointing out the importance of a poetic view on digital writing. The question though is whether one agrees with their interpretation of the effects that the new technology might have on the relationship between text and image. There are some problems with their sources as well as with their arguments which will be of interest to this debate:

A major problem is the fact that they all base their views on visual material which is more than ten years old. Digital technology moves extremely quickly and the situation presents itself very much differently today than it did ten years ago. Landow's re-edition of *Hypertext* in 2006 has not acknowledged changes in this respect and neither have Glazier's *Digital Poetics* from 2002 or Bolter's *Writing Space* re-edition from 2001. Glazier even declares the mid 1990s as a defining time for Web conventions (2002, p. 86), a claim which in its totality is not justifiable.

The next main problem is that none of the three authors considers the move from stand-alone computing to network computing which has taken place over recent years and the effects that it has on the design of interfaces. Chapter four demonstrates that stand-alone digital applications like CD-ROMs or video games deliver scenarios for visually rich information display while the Web, as an interface to a virtually endless

amount of data, fosters a totally different approach to interfacing based on the semantics of alphanumeric text.

The third problem is that at least Bolter and Landow do not really consider the technological backdrop of digital data and computing sufficiently. They do not recognize that from a technological point of view hypertext treats images and text totally different, which severely restricts the possibilities of what they describe as picture writing; a fact discussed in detail in chapter five.

A further issue is the lack of evidence from cognitive science in the work of all three authors. While they call extensively on cultural and critical theory to explain the effects that different forms of communication have on humans, they seem to have little concern for how images and text actually fit into the context of human thinking and man's perception of the world. The idea, for example, that hypertext appropriately represents associative human thinking structures is taken on board by Landow without further investigation. The German media theorist Winkler (1997, p. 47) explains that such a connection is questionable at least:

> Has not psychology always talked about associations which are pictorial, blurry, overdetermined, elusive or ineffable? Associations, to which one cannot assign a distinctive linear or netlike/multi-linear character. Again it seems that there is too little known about the human ways of thinking for 'associative thinking' ... to become a meaningful blueprint for technical implementations.[19]

Furthermore, Bolter's and Landow's view on writing does not take into account some quite compelling evidence from anthropological history regarding the development of text. Bolter (2001, pp. 59) supports his view on text as a primarily narrative tool with the notion that alphanumeric writing has supposedly developed in a soft shift from narrative writing with images. Chapter two points out that it is quite reasonable to assume that alphanumeric writing might have developed as a highly abstract technology based on accounting rather than on narrative (Schmandt-Besserat, 2006).

Cognitive science can also deliver a new perspective on another aspect of this thesis. The idea that media shift from image writing to alphanumeric writing and back to

[19] Translation by author. German original: 'Hat die Psychologie nicht immer auch von Assoziationen gesprochen, die bildhaft, verschwommen, überdeterminiert, flüchtig oder unartikulierbar waren? Assoziationen, denen keineswegs ein distinktiv-linearer oder netzförmig/multilinearer Charakter zugeschrieben werden kann. Ein weiteres Mal scheint über menschliche Denkvorgänge viel zu wenig bekannt, als daß *das assoziative Denken* (und sei es *des Alltags*) eine sinnvolle Folie für technische Implementierungen darstellen könnte.'

image writing as Bolter, Landow and Glazier assume, reveals a somewhat deterministic perspective on media in which the media itself to a large extent define the way that humans communicate. The media philosopher Vilem Flusser (2003) in his essay *Die Krise der Linearität* (English: The Crisis of Linearity) offers an interesting alternative. He explains how image and text are two fundamentally different ways of dealing with the world:

> Ontologically, imagination is a very doubtful position. The images that emerge from it are connotative and subject to the inner dialectic of all mediations. However, before one acts, one necessarily has to create images. Therefore the images have to be subject to a criticism that allows to clarify their ontological position, to denote their codes and to clear up the ideological confusion caused by them. Linear writing has been developed for exactly this reason.[20]

Chapter three looks at cognitive science but also at information theory in order to back up Flusser's theory. Thus, it explains how humanity has developed these basic information technologies and now uses them in order to gain an ever more complex understanding of the world.

The sources drawn on, cover various areas of cognitive science: Humberto Maturana and Francesco Varela, the authors of *The Tree of Knowledge* (1987) worked together as biologists who extended into neuroscience and philosophy. Antonio Damasio, who wrote *Descartes' Error* (1995), is a behavioural neurologist and neuroscientist while the author of *The Ecological Approach to Visual Perception*, James Jerome Gibson (1979), was a psychologist. Maturana, Varela and Gibson are quite common reference points in literature regarding human computer interaction[21] and all of them, including Damasio, come to the same conclusion albeit from different perspectives: To them, the human perception of the world is not an act of receiving images from the outside world. Seeing the world is an act of imagination:

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[20] Translation by author. German original: 'Einbildung ist ein ontologisch zweifelhafter Standpunkt, die daraus entstandenen Bilder sind konnotativ, und sie sind der inneren Dialektik aller Mediationen unterworfen. Es ist jedoch unerlässlich, sich Bilder zu machen, bevor man darangeht zu handeln. Daher müssen die Bilder einer Kritik unterworfen werden, welche erlaubt, ihre ontologische Stellung zu klären, ihre Codes zu denotieren und die von ihnen gestiftete ideologische Verwirrung abzuräumen. Zum Zweck dieser Kritik eben ist die lineare Schrift erfunden worden. '

[21] Donald Norman (1998), for example, one of the leading experts in interface and interaction design, appropriates J.J. Gibson's theory of affordances for interaction design. Maturana and Varela are referred to by Winograd and Flores in their book *Understanding Computers and Cognition* (1986), as well as by Peter Krieg (2005) in *Die Paranoide Maschine* (Engl: The Paranoid Machine).

> When you see, you do not just see: you feel you are seeing something with your eyes. Your brain processes signals about your organism's being engaged at a specific place on the body reference map. (Damasio, 1995, p. 232)

The work of linguist George Lakoff and cognitive scientist Mark Johnson shows how the development of language builds on this process and that it is not simply an act of attaching meaning to objects or properties in the world. Lakoff (1987) in *Women, Fire and Dangerous Things* as well as Lakoff and Johnson (1980) in *Metpahors we Live by* explain that language, and with it text, emerges from an iterative process of imagination and abstraction: new concepts are named with the help of metaphor. After some time the metaphor dies, which means that the original image which the metaphor refers to, is deducted, or abstracted for that matter. The newly established word or word combination then turns into a building block for new metaphors and new concepts. This is one of the arguments brought forth in chapter three to explain why the process of abstraction is by far more fruitful than the *inclusiveness* of the image.

Another field astonishingly absent from the discussion about the iconic turn is the whole domain of human computer interaction, the field that investigates the possibilities for interfacing with computers. When it does appear there is some discrepancy between theory and practice. Landow (2006, p. 88) criticizes one of the leading usability experts, Jacob Nielson, for his alleged ignorance with regards to the importance of the image in the context of Web. It is very interesting to see how he argues against the empiric evidence brought forth by Nielson:

> This same prejudice against visual elements appears in recent supposedly authoritative guidelines for creating websites. Jakob Nielsen's Designing Web Usability, for example, advises web designers to avoid graphic elements particularly for opening screens (homepages), because they unnecessarily consume both bandwidth and screen real estate. I certainly understand the reasons for such advice... Early web designers found themselves so understandably enthralled by elaborate graphics and animation that they cluttered sites with nonfunctional elements that consumed important resources... but avoiding graphic elements as a basic design principle doesn't make much sense for one obvious reason: images and other graphic elements are the single most important factor in the astonishing growth of the Word Wide Web.

Bolter, on the other side, draws extensively from the graphic designer Siegel's book on *Creating Killer Website* (1996) which argues very much in favour of image writing. These references show how far detached from the actual events Bolter's and Landow's writing can be at times. Contrary to Landow, Web experts like O'Reilly (2005) would certainly argue that social networking or e-commerce are the main important factors for the growth of the Web in the recent years. There is no evidence whatsoever to support Landow's claim and Siegel's book is totally out of date. Landow (2006) and Bolter (2001) are clinging on to ideas that might be reflecting parts of the reality of the early days of web design but definitely not the developments of recent years. Accordingly, in order to produce a correct picture of the technological and psychological reality of personal computing and the Web, chapters four and five relate quite extensively to theory and practice of human computer interaction: Douglas Engelbart (1962), Alan Kay (1990), Jef Raskin (2000) and Donald Norman (1998, 2004, 2007) to name just a few of the most iconic figures.

Finally, three other authors should be mentioned whose writing has had much influence on the development of this argument. Michael Hobart and Zachary Schiffman, both professors of history, together wrote the book *Information Ages* (1998) in which they convincingly explain how the development of writing is actually not so much related to the wish to hand down narrative, but to a human 'urge to classify'. Classification though, is a comparative and synchronous activity which contrasts greatly with asynchronous time bound narration. This is one of the main arguments brought against the claim that there is a certain necessity in breaking up linear writing structures. Hobart and Schiffman's argument is used particularly in chapter six to show that text has always had synchronous and asynchronous qualities simultaneously, which demonstrates that the definition of text as being linear is inadequate.

The aforementioned German theorist Hartmut Winkler in 1997 published *Docuverse*, answering to a lot of the arguments of hypertext theory. While it was still early days, Winkler (1997) already predicted that the surge of digital images might not be what it seemed at that time:

> It should not be denied that there was an explosion of digital image processing, postproduction and image synthesis. The argument though is, that this represents a huge effort rather than a spectacular success. The exorbitant resources needed for image processing are an indication that images do not actually represent one of the strengths of computers (p. 219)...it is much more likely then that

> the universe of text, already pronounced dead, is actually seeing an unexpected continuation.[22] (p. 243)

Winkler's clear-sighted analysis offers quite a lot of reference points for this thesis. Particularly how he denounces the wish to make intertextuality tangible through hypertext as a metaphysical dream is referred to in chapter three at lengths. While this thesis refers to some of Winker's writing, it is nevertheless a totally new investigation on the basis of the developments of the recent decade.

1.5 Methodology

The methodology of this thesis is a theoretical discourse in which the author engages in a discussion with theories surrounding electronic writing. In a first step current significant theories with regards to the contemporary practice of electronic writing are selected and brought into context with one another. Subsequently their arguments are tested in two ways: Firstly their validity is discussed on an extended backdrop of theory to set it against a broader context. Secondly they are exposed to the evidence of technological developments and changes in design practice of the recent ten to twenty years. In a final step the findings of this discussion are synthesized into a new hypothesis about the status of the alphabetic text in current digital media and the effects this has on the role of the graphic designer.

This investigation was undertaken in two main parts: the first part, comprising chapter two and three, answers to the theory by bringing in new evidence, drawing from cognitive science, cultural history, information theory and linguistics. This rather wide approach to theory is nothing unusual when it comes to reflections on issues of human computer interaction which is the wider field that this whole thesis resides in. Terry Winograd and Fernando Flores, for example, in their widely recognized book *Understanding Computer and Cognition* (1986) do combine cognitive science, the phenomenological branch of philosophy and computer science in order to explain how inter-human communication and thinking differ from human computer interaction and computing. Paul Dourish (2001) in his work *Where the Action Is: The Founda-*

[22] Translation by author. German original: 'Es soll keineswegs geleugnet werden, daß es eine Explosion der digitalen Bildbearbeitung, der Postproduction und der Bildsynthese gegeben hat. These aber ist, daß es sich eher um einen Kraftakt als um eine souveräne Eroberung handelt und daß bereits der exorbitante Ressourcenbedarf der Bildverarbeitung darauf hindeutet, daß Bilder nicht eben die Stärke der Rechner sind. (219)... Sehr viel wahrscheinlicher ist deshalb, daß das totgesagte Universum der Schrift gegenwärtig eine unvermutete Fortsetzung erlebt (243).'

tions of Embodied Interaction explains a new embodied approach to interaction design by similarly drawing from computer science and phenomenological philosophy. He then adds sociology, in particular the method of ethnographic studies, to the theoretical mix. Paul Krieg's (2005) *Die Paranoide Maschine* (English: the Paranoid Machine) digs deep into cultural history, philosophy, cognitive science and computer science in order to explain how new concepts of computing could overcome the restrictive computing paradigm of strictly hierarchical logic. Why is it that the domain of human computer interaction attracts such a broad approach towards theory? This dates back at least to the late 1940s and early 1950s when Norbert Wiener (1946) launched cybernetics as a 'new science of communicating beings and machines' (Conway, Siegelman, 2005). Wiener had found certain parallels between the workings of complex machines such as computers and that of the nervous system of living beings. Thus, he concluded that synergies and new knowledge could be won from combining and relating the research into complex organic and mechanical systems. The first academic circle in which issues of cybernetics were discussed on a regular basis, the so-called Macy conferences, were an eclectic mix of scientists from computer science, physics, social science, neurophysiology and psychology which was a rather unconventional approach at the time (ibid, 2005). Ever since, computing has reached, and influences, almost every single aspect of human life. Thus, a widespread approach to the relationship between human and computer is the result of the nature of the subject itself.

The second part of the thesis comprising chapter four and five investigates the relationship between theory and contemporary practice. It is an analysis of how the theory regarding a strong iconic turn reflects in computer interfaces as well as in the work of the designer. Chapter four researches general issues with regards to human computer interaction as well as approaches towards designing those interactions. The two main paradigms when it comes to interaction with computers are dialogue and the manipulation of objects, thus representing the paradigms which generally describe human interaction with the world as such. The question which has to be addressed is whether these forms of interaction are prone to an iconic approach which the predominance of the desktop metaphor seems to suggest. If it is possible to challenge the inevitability of an iconic approach towards screen-based human computer interaction, the arguments in favour of a strong digital media driven iconic turn will appear in a different light. In order to achieve this, chapter four analyses how it came to the development of the GUI and the usage of the desktop metaphor and icons. The examples cho-

sen to illustrate this point are the desktop and word processing software. They have two things in common: many interactions are based on icons and both are two of the busiest contact points for many computer users in the original set up of the *personal* computer. During this analysis, the GUI is exposed to its existing critics, which shows that an iconic approach towards interaction is a historic coincidence and not a necessity and that there are alternatives. What follows is a further analysis of the situation of the GUI in the face of the developments of recent years which answers to the following question: what happens when an interface based on metaphors of restricted personal space, the desktop, meets the Internet which is built on metaphors of unlimited movement and text-based semantics?

If, as this research suggests, the interface paradigm of the Web is slowly undermining the desktop and its iconic approach altogether, it makes sense to scrutinize in more detail the principles behind the design and display of information on the Web. This is the purpose of chapter five. In order to put this analysis into context there is first a consideration of how the protagonists of a strong iconic turn perceive and explain web design and the role of the designer. In the next step there is a detailed view of the technological basis of information display and particularly of image display on the Web and how this defines the scope for design. This answers the question whether the Web is really fostering a coalescence of text and image as Bolter, Landow and Glazier suggest. Based on the foregoing evidence, the end of chapter five defines the role of design and the designer in the context of the Web and in opposition to the print designer.

The main corpus of the thesis – chapters two to five – is a discussion of theory and contemporary practice and their relationship. The sixth and final chapter, synthesizes the outcomes of the analysis into a vision and a new understanding of creativity in the context of digital writing.

This research must be assessed solely on the basis of its written body. Nevertheless, there was some substantial studio work involved. Creating a hypertext or even an experiment in multi-linear storytelling, for example, creates an involvement and insight which can hardly be gained from looking at somebody else's production. Accordingly, the studio work was established as a method of practical involvement and inves-

ıre 7: *The Lost Cosmonaut*, a storytelling environment for digitally enhanced paper which was developed in the context ıis research (see appendix for a more detailed description). (Image source: author's photo)

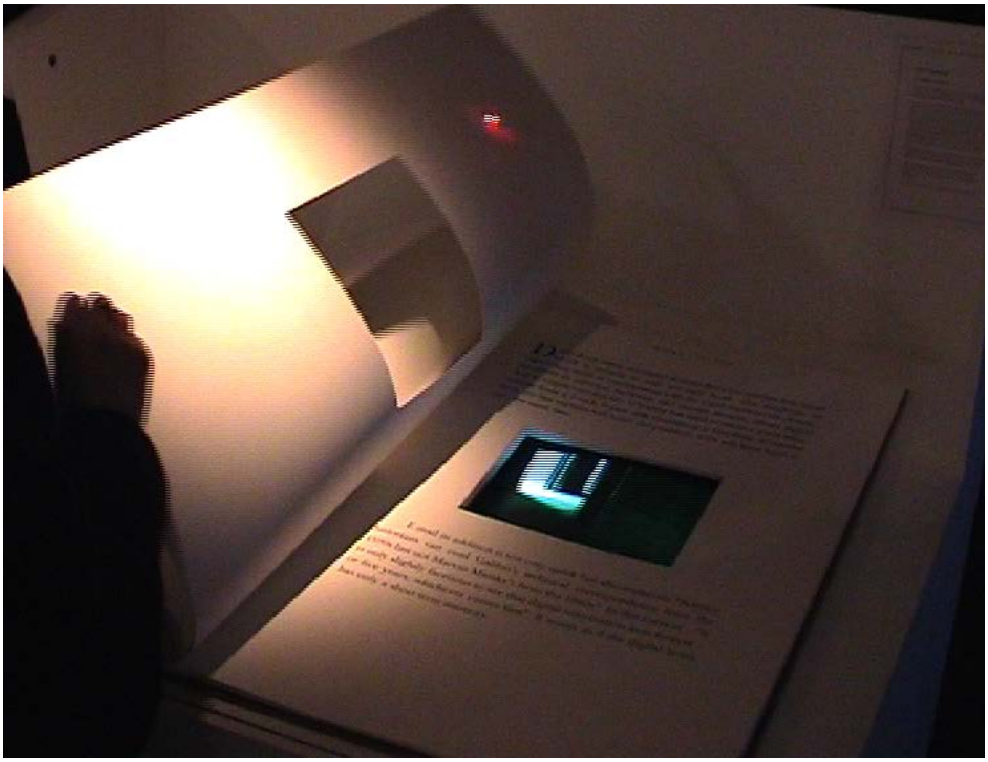
tigation supporting and informing the theoretical discourse[23]. An appendix gives an overview of the artworks which evolved from this. Two pieces which had a very decisive impact on this thesis are explained in short here. One of the projects was undertaken as a collaboration with the GlobIS lab at the Swiss Federal Institute of Technology (ETH) and the Zurich University of the Arts (HGKZ)[24]. One of the GlobIS lab's research fields lies in technological infrastructures for digitally enhanced paper. This technology combines normal analogue paper with the computer. Thus, handwritten text and drawings can be sent through the pen to the computer and turned into digital formats. But pen and paper can also be used to edit and control digital events. Touching a specific area on the paper with the electronic pen could, for example, trigger the playing of a sound, a movie track or the upload of a specific Web URL. The bottom line is that the pen and the grid turn analogue paper into an interface for a computer. The idea of this project was to investigate the possibilities of digitally enhanced paper as a tool for both telling and writing a story (Vogelsang, Signer, 2005), resulting in a piece called *The Lost Cosmonaut* (figure 7 and appendix I).

This engagement with experimental interfaces for storytelling did not arise unexpectedly but is strongly related to a previous work, *The Memory Palace*, which was done as the final piece for the MA communication design (figure 8). The installation combines a book with movies which ran on a screen revealing themselves through cutouts in the book pages. While these movies are nothing more than random clips shot by a camera moving through a derelict neo-gothic hotel, each page contains a quotation or other short text related to memory. Once the reader turns a page he cuts through an infrared beam which triggers a new movie. This gives the impression that a specific page and text are related to a specific movie while the choice is actually random and even though the text is not designed as a continuous story, the movies enforce an illusion of continuity. Thus, the piece is actually using strategies of multilinear narrative, an issue with which hypertext theory is very much involved.

Both pieces triggered the interest in the theoretical aspects of storytelling, writing and particularly hypertext theory as a theory of writing for digital media in the first place. A lot of the questions regarding the spatial and temporal organisation of a text

[23] In hypertext theory which is one of the fields of investigation of this thesis, the idea of a theorist producing artworks is quite common. David Jay Bolter and Stewart Moulthrop are two authors who also involve in practical experiments with hypertext narrative. The poet and theorist Loss Pequeño Glazier is another example.

[24] This collaboration was taking place in the form of an artist residency which was initiated by the Artists in Labs project of the Zurich University of the Arts under the direction of Professor Dr. Jill Scott.



ıre 8: The author's interest in the relationship between text and image, as well as in multi-linear storytelling goes back ɜral years. *The Memory Palace* is an earlier piece, in which a book is used an interface for a movie database. (Image rce: screenshot from movie by the author)

could thus be experienced first hand. In this way two more pieces were approached: a database movie called Partial Eclipse (see appendix I) and some experiments in visual moving poetry (see appendix I).

But these artistic investigations were not the only hands-on practice which had an influence on the thesis. As a Web designer and information architect, the author of this thesis constantly has to deal with issues of data organization, primarily text. This includes coding basic HTML based websites, the set up of database driven content management systems and working with and advising on both, Wikis[25] and blogs. Interfaces for standalone software as well as computer based help and training systems round up this practice. Thus, all relevant areas of practice were covered and experienced on a relatively intense level.

In the context of this thesis, standard documentation practice is similarly turning into an experiment about forms of writing. Over the years, various possibilities of logging and organising the research from traditional paper to various digital applications were tried out and helped to inform the writing of this thesis. A lot of these experiences have found their way into the text, either indirectly as part of the underlying process but also directly in that they became a subject of the reflections on writing. Hence, it is fair to say that the thesis developed in an iterative process of reading, writing, concomitant studio work and various practices of logging and organising research notes.

One of the main practices involved in this thesis has not yet been mentioned. There is the expression of *writing up a thesis* which indicates that at the end of the research process the student simply writes everything together, as if things would just fall into place. It became clear through the research that writing is not necessarily something that one does at the end. While reading inspires and broadens the perspective, writing was experienced as a way to bring order and focus to thoughts. But it is also a creative process in that it fosters a very specific mindset and way of thinking in which connections are made and ideas are developed. And as the thesis increasingly

[25] 'A wiki (sometimes spelled "Wiki") is a server program that allows users to collaborate in forming the content of a Web site. With a wiki, any user can edit the site content, including other users' contributions, using a regular Web browser. Basically, a wiki Web site operates on a principle of collaborative trust. The term comes from the word "wikiwiki," which means "fast" in the Hawaiian language.
A wiki allows a visitor to the "wikified" Web site to edit the content of the site from their own computer. Visitors can also create new content and change the organization of existing content. The simplest wiki programs allow editing of text and hyperlinks only. More advanced wikis make it possible to add or change images, tables, and certain interactive components such as games.
A wiki provides a simplified interface. At any time, contributors can conveniently view the Web page as it looks to other subscribers, before and after the changes they have made. It is not necessary to know HTML (hypertext markup language) or perform work in HTML code. The best known example of a wiki Web site is Wikipedia, an online dictionary building collaboration.' ('Wiki', <http://www.whatis.com>)

turned into a text about a specific writing medium, writing became even more relevant as a practice. Like the studio work, it provided a lot of empiric insight into the writing process without necessarily producing any verifiable evidence.

The writing process which resulted in the text which one is now reading is actually only one of the many forms of writing which took place in the process of this research. It transpired that the whole research was an experiment and exploration of the theme of writing in various media.

2.0 WRITING: IMAGE AND TEXT

2.1 Introduction

Writing is a continuation of language. It is an externalisation of thought through a symbolic language. What role does language, both written and spoken, play in human communication? What drove humans to the enormous achievement of turning analogue sounds into a system of twenty six discrete letters in the first place and how did they achieve it? Is it that alphanumeric writing developed from image writing through a progressive process of abstraction? As this chapter tries to answer these questions, it necessarily approaches the more general question of how text and image relate. An overview is provided of some of the ideas and concepts that have developed around these issues with a very specific emphasis on theories relating to text and image in the context of digital media. Of particular interest is the notion of hypertext that is hailed as the specific form of writing that will define at least the beginning of the digital age. Some say it might even be the beginning of the end of alphanbetic writing. Thus, this chapter provides the necessary grounding for this thesis.

2.2 Orality and Writing

Before there was writing there were no writers and no readers, just speakers and listeners. As obvious as this might seem, the relationship between humans and their tools of representation should not be underestimated. Plato (1970) realized as much when he launched into a harsh criticism of the then relatively new technology of writing. Ironically, European philosophy has been declared as a footnote to Plato's writing (Witehead, 1929, p. 53) while he himself (Plato, 1970, p. 296) found that written words could 'neither speak for themselves nor teach the truth adequately to others'. Knowledge of truth, according to Plato (ibid, p. 295), can only rest inside the human heart whilst writing is only a reminiscence of what we know. To him, writing is an inferior ersatz for the real thing. It is of minor value because it does not speak. The written words are unresponsive (Ong, 1982, p. 79). For Plato the word belongs to the domain of 'meditative search' (Illich & Sanders, 1989, p. 24) as well as to human discourse where it constantly has to prove itself through debate. But Plato's critique does not leave the image unscathed. To the contrary, he (1970, p. 295) takes the inferiority of the image as a given fact by letting Socrates say: 'I cannot help feeling, Phaedrus, that

writing has one grave fault in common with painting; for the creations of the painter have the attitude of life, and yet if you ask them a question they preserve a solemn silence.' This contempt for any form of unresponsive visual representation, which includes writing, makes sense if one considers that Greek culture at Plato's time was still deeply rooted in oral tradition (Heim, 1999, p. 54; Illich & Sanders, 1989, pp. 22), so deep that its most famous poet was said to be blind and the blind poet is a poet who neither reads nor writes, he only speaks and hears[26].

But in the same oral traditions lies the resolution for the paradox of Plato's written criticism of the written word: while on one side he sees memorizing, learning *by heart,* as an essential virtue of the philosopher, Plato also recognizes the deficiencies of the spoken word when it comes to tradition (Heim, pp. 54). Transferring knowledge from one person to another, from one generation to another based on mouth to ear works in a very specific frame of mind. The speaker has to evoke a very vivid and emotionally enthralling scene in order to capture his audience, or as Heim (ibid) puts it, poetry as the way of tradition in oral cultures is 'based on sharp narrative images [which] strongly reinforces an emphatic, tribal emotional identification with admired cultural heroes'. Hence, Phaedrus, as much as it criticizes writing, also highlights the problems which come with poetic language (Heim, ibid.). The *imaginative*, passionate and personal mindset of poetic oral tradition stands in opposition to the reflective, analytical and impersonal inquiry of a Socrates or a Plato. Thus, so Heim (ibid, p. 55) concludes, 'Plato places Socrates into book form in order to help establish the kind of culture where a Socrates might have survived' or as Ong puts it, 'writing separates the knower from the known and thus sets up conditions for "objectivity"' (ibid, pp. 45). And in a logic extension of this thought, writing is the precondition of western analytical science as such.

2.3 Text versus Image

Havelock (1963) and Ong (1982), two of the most acknowledged researchers of the comparison between oral and literate culture, draw a direct line between those two domains without considering any earlier writing forms that might have included imag-

[26] Whether Homer was really blind or whether he existed at all will probably never be found out. According to Plato (1970. p. 259), Homer's blindness is a consequence of his 'reviling the lovely Helen' and thus enraging Eros and Aphrodite. However, the fact that Plato highlights his blindness, emphasises the importance of this feature and allows for the assumption that Homer's blindness is important on a metaphorical rather than a historical level.

es or icons. This is not surprising, as they both refer to classical Greek culture and the Greek phonetic alphabet was based on the Semitic alphabet imported from Asia Minor (Illich & Sanders, 1989, p. 12). A classical Greek pictorial writing system is not known to have existed. The Greek directly went to a transliteration from sound to text, without detour via the image. The beginning of this chapter has shown that the image nevertheless, plays a role in this process, that is the mental image. Writing offers an alternative to the strong image-based mindset which speech has to reside in, in order to be memorable.

Flusser (2003, pp. 71) explicitly includes the image in his ontology of language and related media. Humans, according to Flusser (ibid), before they started to write, tried to tame the world via the image. Painting, the depicting of one's *imagination*, is an act of abstraction, but also an act of stepping out of the flow of the real world. Man turns into a subject in control of the objects that it depicts through the image. 'The world is not an obstacle any longer that we bump into but it turns into a phenomenon that we look at'[27] (ibid, p. 72.). But Flusser (ibid, p. 73) also notes that, in regards to its qualification as a medium, the image has two problems: first, it is highly connotative which makes it an extremely unreliable code. And second, the image, rather than negotiating between the real world and the human being, tends to situate itself between man and the world. The German word for imagination is *Vorstellung* from the prefix vor=before and the noun stellen=to position, to situate. Translating it according to these etymological roots, the word Vorstellung means *to put in front*. Thus, the image becomes iconic. It turns into the real thing. And so 'as a consequence instead of using the images as an orientation for the real world, humans use their experience in the real world to orientate themselves in the images' [28] (ibid, p. 73) – an experience that anyone has had who ever carried around or kissed the photo of a beloved one.

This is where the physical image crosses over with the mental image of the oral mindset. Being the only way of reporting and memorizing important events in oral culture, the epic poem performed by a bard is news and mystification simultaneously. Slowly the myth replaces the real event and thus, in an oral society, the spoken word and the image have a very similar effect. No wonder myths are actually referred to as 'participatory images' (Hobart & Schiffman, 1998, p. 30) which keep alive the cultural

[27] Translation by author. German original: 'Die Welt ist nicht mehr ein Widerstand, gegen den wir stoßen, sondern sie wird zu einer Erscheinung, die wir uns ansehen.'

[28] Translation by author. German original: 'Die Folge ist, dass die Menschen die Bilder nicht mehr als Orientierungen in der Welt verwenden, sondern umgekehrt: Dass sie ihre Erfahrungen mit der Welt als Orientierung in den Bildern verwenden.'

memory. This is further confirmed by antique mnemotechniques, particularly the notion of the memory palace (Yates, 1966). The orator memorizes a speech by setting up an imaginary architecture in his mind. The rooms are then 'mentally filled with objects that represent concrete and abstract topics of the speech, by the virtue of metaphor, onomatopoetic resemblance or other figures of speech' (Cramer, 2005, p.43). In order to recite his speech, the orator virtually wanders in his mind from room to room.

But humanity, and particularly classical Greek philosophy, was looking for a different kind of truth and wanted to step out of mythology and out of the world of images and icons. According to Flusser (2003, pp. 73), as a consequence humans developed a denotative technology which would help to describe and criticise the images or, as Hobart and Schiffman (1998, p. 28) express it, those 'participatory images of the epics – experienced by the oral culture as the flow of speech – are "taken out of" the flow and, by that literal act of abstraction, given "form."'[29] In this sense, alphabetic writing is clearly directed against the image as such but also against writing with images:

> The alphabet is a clear rejection of ideographic writing… Ideogrammes are signs that stand for »ideas«, that is, pictures seen with the inner eye. But it is exactly this adherence to the image that should be avoided when writing. Writing should explain images, or better explain them away. The figurative, envisaging, imaginative thinking is supposed to give way to a notional, discursive and critical one. (Flusser, 1987, p. 34)[30]

2.4 From Text to Hypertext

In the Western world alphabetic writing and particularly the text in book form, the codex, has been the dominating form of notating human language for more than 2000 years. But now the digital age has brought forth a new form of writing, at least that is what the word hypertext and what hypertext theory suggest. Hypertext theory is not a fully established branch or sub-branch of the classical canon of sciences but more a description which loosely connects some theorists – often practitioners of digital literature at the same time – who specifically in the 1990s and the early years of the new

[29] Thus writing is actually the beginning of information (ibid.).

[30] Translation by author. German original: 'Das Alphabet ist eine deutliche Absage an das ideografische Schreiben. Trotz aller Vorteile der Ideogramme sollen Buchstaben geschrieben werden…Ideogramme sind Zeichen für »Ideen«, für mit dem inneren Auge ersehene Bilder. Das Festhalten von Bildern aber soll beim Schreiben gerade vermieden werden. Schreiben soll Bilder erklären, wegerklären. Das bildliche, vorstellende, imaginäre Denken soll einem begrifflichen, diskursiven, kritischen weichen.'

millennium discussed issues of writing in the then new media, with a very specific emphasis on hypertext. The most common form of current hypertext is the World Wide Web and it is the great achievement of theorists like Landow and Bolter to have carried the discussion about the role of hypertext as a literary medium before the Web actually existed. Bolter and Landow are arguably the most distinguished writers when it comes to the specific debate about hypertext and literary theory. Both of them wrote their standard works about hypertext in the early 1990s: the first edition of Bolter's *Writing Space* stems from 1991 while Landow's *Hypertext* was first published in 1992. Meanwhile, both of them have issued heavily revised second editions, Landow even a third. As both authors have used these editions to reinforce their original statements, it is mostly the latest versions which this thesis refers to. In Bolter's case the latest one is from 2001 and in Landow's case as recent as 2006.

Other exponents of hypertext theory are J. Yellowlees Douglas (2000) who actually countered some of Bolter's and Landow's ideas as well as Katherine Hayles and Stewart Moulthrop. Hypertext was also discovered as an artistic tool and soon the first hypertext narratives or hypertext fictions appeared[31]. Among these practitioners were some of the aforementioned theorists. Stewart Moulthrop is to be mentioned in this respect but also Bolter, who as early as 1984, together with Michael Joyce, ventured into software development for hypertext narrative, which resulted in a product called Storyspace[32]. Accordingly, in the mid 1990s, when the public mainstream and the designers were only just becoming aware of the Web as a new medium, these theorists and practitioners were already leading a highly distinguished discourse about the aesthetics and the cultural role of hypertext.

Before looking at hypertext theory and its arguments in detail, it is necessary to revisit the foundations of hypertext itself. The word hypertext implies that it is a form of writing which goes beyond writing. Vannevar Bush, who is often seen as its intellectual father, saw a deficiency of the classical carrier medium of text which asked for such a step beyond. During the Second World War he was the coordinator of the American scientific war efforts on which industrialized warfare depends so much. As the director of the Office of Scientific Research and Development, he was the head of

[31] One of the first examples and frequently quoted when it comes to hypertext theory is Michael Joyce's *afternoon, a story* (1987). Another artist working in this domain is Judy Malloy, whose work can be found online at <http://www.well.com/user/jmalloy/>.

[32] Available through <http://www.eastgate.com/storyspace/>.

thousands of scientists and realised how increasingly difficult it had become to 'transmit and review the results of research' (1945). Bush highlights the fact that research like this thesis is to some extent a text built on other texts. Through the rapid increase in publication it became more and more difficult to show these interconnections as well as to move between the different texts. His description of these issues was published in 1945 in an article called *As We May Think*. At the core of the solution was the *Memex*, a machine which would allow scientists to store and miniaturize any kind of pictorial or textual information but also to capture ones own trail through the research material (figure 9). This practice could be extended from one text or scientific paper to the scientist's whole field of research. Thus, he could jump from text to text simply via a few keystrokes. The technical solution to the Memex was based on microphotography rather than on digital computing, as the latter was still in its early days and used more as a calculating device rather than as a tool for word processing or even multimedia.

The Memex in the proposed form never materialized and it took more than two decades until the ARPANET laid the foundation for such an interconnected information space now known as the Internet (Naughton, 1999). However, Bush's great achievement was his vision that the researcher's train of thought should be made visible through several sources via 'associative indexing' (Bush, 1945). Thus, texts would not only be referenced, but any kind of text could actually be interconnected. And so the beginning of the history of hypertext is closely related to Vannevar Bush and the year 1945. It is worth mentioning though, that the idea of collaborative and non-linear written knowledge production does originate far earlier than the twentieth century. The beginnings of the Talmud, for instance, the record of Jewish Rabbinic debate, date back to 200 AD (The New Encyclopaedia Britannica, 15th edn, Macropedia, volume 22, pp. 406) (figure 10). Historically though, such a combined effort is the exception with the idea of individual authorship prevailing. But even a single authored text, such as this thesis, employs strategies and elements which go beyond the time-bound flow of the main text, such as referencing, footnotes, endnotes, image captions and tables of content. These tools either give assistance in traversing a text other than along the standard reading direction or build connections to other texts and thus, can be seen as the equivalent of hyperlinks. Accordingly, McKnight, Dillon and Richardson (1991, p. 25) rightly suggest that while early manuscripts were 'undoubtedly 'linear' in terms of

content and usage', by the 13th century there was no longer such a thing as a linear document. New concepts such as word spacing, chapter divisions, summaries and margin glosses enabled cross-reading of any codexical work.

The expression *hypertext* was coined by Ted Nelson (1965). He (1992, p. 1/17) defined it as 'non-sequential writing' and envisioned his own version of hypertext, the visionary project *Xanadu*, as a network which could be a 'universal storage of all data' (ibid). Nelson was also the first one trying to implement Bush's idea on the basis of a digital network. Xanadu was founded in 1960 (Project Xanadu, 2007) but never took off. Nelson, though, is still working on it as an alternative to the Web. The more successful version of hypertext which Berners-Lee implemented in the early 1990s (Naughton, 1999, pp. 229) and which is now known as the World Wide Web did not meet with Nelson's approval. To him, it is simply a trivialization of his original concepts (Project Xanadu mission statement, 2007). Nelson's Xanadu was supposed to empower the user to set links and edit texts at free will (Nelson, 2005), a freedom comparable only to current Wiki applications with which it also shares the possibility of text version management.

From the many matters surrounding hypertext, the ones that are of main importance for the hypertext theorists are the interconnectedness of texts and their allegedly non-sequential relationship. The likes of Landow and Bolter had realised that Bush's ideas, and with it hypertext, hit the core of a philosophical issue. While Bush had come to his conclusions through an empiric problem, Bolter (2001) and Landow (2006) refer to poststructuralist philosophy. One of the concerns of poststructuralism is a revolutionary rethinking of the concept of authorship which pervades western culture. An essential notion of this rethinking is the idea that all texts are written and are to be read 'in relation to other texts' (Culler, 1975, p. 30), a phenomenon called intertextuality: 'A text cannot be created simply out of lived experience. A novelist writes a novel because he or she is familiar with this kind of textual organization of experience' (Ong, 1982, p. 133). Barthes (1977, p. 143), in his programmatic essay 'The Death of the Author', goes so far as to pass on the ownership of the text from the writer to language itself: 'it is language which speaks, not the author.' Inevitably, the destruction of the author did not leave traditional text media unscathed. The book was declared to be in a crisis (Derrida, 1976, pp. 85; Derrida, 1981, p. 3), unable to display complex intertextual relationships. Technically speaking the problem was located in what was seen as the one-dimensional linear flow of writing (Derrida, 1976, pp. 86) which opposed

ical, economico-political, linguistic) problematic of the family
o an ontological problematic, the place that we have just now
ognized cannot be gotten around [*incontournable*].
If *Sein* cannot be what it is, cannot posit itself, become and
old itself, manifest itself without traversing Christianity's des-
y, that is first because *Sein* must determine itself as subjec-
ty. Being perhaps lets itself be re-covered and dissembled,
and or determined by subjectivity (Heidegger), but that is, for
gel, in order to think itself. First in Christ.
Jesus' revolution consisted in opposing the subjective principle,
t is the principle of freedom, to the enslavement of objective
s or more precisely of objective commandments. Each time
as transgresses one of these commandments, for example a
scription of Jewish ritual, he does so in the name of man,
bjectivity, and the heart. Thus, on the Sabbath day he cures a

the miracle of the hand: Jesus restores to a man the use of a hand of which he was deprived: "On the same day [the Sabbath] Jesus healed a withered hand (*eine verdorrte Hand*)."
"For the son of man is lord of the sabbath. And passing on from there he went into their synagogue, and behold, there was a man with a withered hand. And they questioned him, saying: Is it lawful to heal on the sabbath? They meant to bring a charge against him. But he said to them: Will there be one of you who owns one sheep, and if it falls down a hole on the sabbath, will not take hold of it and pull it out? How much better a man is than a sheep. Then he said to the man: Stretch out your hand. And he stretched it, and it became sound, like the other. But the Pharisees went outside and began plotting against him to destroy him."

n's withered hand.
Not that Jesus opposed to the heterogeneous and heteronomous
ectivity of the commandments the formal universality of the
or of a *you must* [tu dois] in the Kantian sense. In that case, the
ish split would only be displaced, and interiorized. The tyrant
the outside would become a domestic tyrant. The (Kantian)
onomy would remain apparent; it would be its truth in a severe
l implacable heteronomy.
Hegel does not doubt the possibility of autonomy. Parodying
nt and *Religion Within the Limits of Reason Alone*, turning his own
tence against him, Hegel displaces the difference: the profound
eronomy of the Kantian *you must* would see to it that between
Shaman of the Tungus, between the prelates of the European
urch, the Mongol or the Puritan on the one hand, the man of
mal duty on the other, the difference would not be between
very and freedom. The first simply have their master outside
mselves, and the second within himself, as his own proper

This time, Harcamone's glas is scattered among eglantine and wisteria [*glycines*]. Harcamone is going to die. One recalls the "eglantine bush" next to the place where he "fell on top of [the little girl]" and ended up cutting her throat after talking "into the child's neck." And the wisteria overflowing the sites of a mimed crucifixion. It — the wisteria — becomes the christic body.

eglantine: one of the popular names for the columbine, also known as Our-Lady's seal [*sceau*], or again, Our-Lady's glove. Presumably, this plant took its Latin name (*aquilegia, aquilea*) from the fact that its nectaries had the curved profile of an eagle's beak or again from the fact that it made one's sight as piercing as an eagle's (*aquila*).
An eagle, male, white eagle, black eagle, Ganymede's eagle, dominates the whole corpus, regularly swoops down on it, from behind, holds it tightly [*le serre*] and in its claws bands it erect, screws it, the beak in the neck [*cou*]. One can say an eagle, female or heraldic [*une aigle*].

Flight/theft [*vol*] without reference, textual fiction, pure letters in the ear or throat. Eagle: tattoo in the *Miracle of the Rose*. Eagle: chimera—associated, in *The Balcony*, with the unicorn, since it has two heads. Eagle: absence of content and weightiness, sublime elevation, flier's/thief's theft/flight [*vol du voleur*] become light and dreaming of being called — somewhat — Ganymede: "I shall be light. I shall have no further responsibility. I shall gaze over the world with the clear regard that the eagle imparted to Ganymede" (*Thief's Journal*). The flight/theft of his empire—polysemy

Touched by grace under the eye of a Perdoux. "I was suddenly [*tout à coup*] touched by the smell of roses, and my eyes were filled with the sight of the wisteria at Mettray. As you know, it was at the end of the Big Square toward the lane, against the wall of the custodian's office. I said it was entangled in the thorns of a bush of tea roses. The trunk of the wisteria was enormous twisted with suffering. It was fastened to the wall by a wire [*fils de fer*] network. Some of the overgrown

ıre 11: A page from Jacques Derrida's *Glas*. Glas is organized in two columns, the left one a text about the German phi-
pher Hegel, the right one about the French writer Genet. Like the Talmud those texts meander their way around other
s, in this case quotations taken from Hegel and Genet themselves but also from dictionaries. Glas was Derrida's attempt
reak apart the allegedly linear structure of the book. (Image source: Derrida, 1986, p. 57)

itself to language as a network from which text emerges (Landow, 2006, p. 63) as well as to the working of the human brain, described as driven by analogy and association (Landow, 1992, p.18). Another concern regarding the classical texts is of a political nature in the sense that authorship of a few defines the agenda of many (Landow, 2006, pp. 321).

Accordingly, Derrida is in search of 'a different form of the book' and so are Deleuze and Guattari (Landow, 2006, p. 59). As a counterpoint, the latter argue the idea of the *rhizome*, a distributed, non-hierarchical knowledge network. Their work *A Thousand Plateaus* (1988) is in itself an attempt to disrupt the boundaries of the book, as is Derrida's *Glas* (1986) (figure 11). Bolter and Landow actually bring together the realm of the engineer trying to solve what seemed an empiric problem and, on the other hand, critical theory which was looking at the same issues from a philosophical perspective. It seemed that philosophers like Derrida, Barthes, Deleuze and Guattari faced the same problem as the engineer Bush: how could the complex relationships between different texts be made visible? Bush's Memex not only seems to give an answer to this question, it also empowers the reader who, whilst documenting his path through other author's literature, gains or regains some kind of authorship himself. This is all the more the case in Nelson's vision of a nodal network with full access to text editing. Hypertext seemed to be the panacea:

> The presence of multiple reading paths, which shift the balance between reader and writer, thereby creating Barthes's writerly text, also creates a text that exists far less independently of commentary, analogues, and traditions than does printed text. This kind of democratization not only reduces the hierarchical separation between the so-called main text and the annotation, which now exist as independent texts, reading units, or lexias, but it also blurs the boundaries of individual texts. In so doing, electronic linking reconfigures our experience of both author and authorial property, and this reconception of these ideas promises to affect our conceptions of both the authors (and authority) of texts we study and of ourselves as authors. (Landow, 1992, p. 22)

But it doesn't stop there. Nelson (1992) himself describes his vision in a book called *Literary Machines*, thus implying that such structures could be used to *produce* literature as opposed to writing it. In the same mindset, Landow (1992, p. 18) describes the Memex as a 'poetic machine' while Bolz (1993) envisions 'authorless texts that write

themselves in the process of reading'[33] to emerge from hypertext. Bolter (2001, pp. 27) acknowledges that new media never replace old media – they rather emerge from a process of remediation – and notes that the Web carries a lot of metaphorical residue from the print age when it comes to the description of digital texts, such as pages, browsing and bookmarks. In that sense, hypertext is a way to include the book and go beyond it simultaneously. The argument further states that while keeping some formal relation to the printed book, the linearity of the book is overcome and the reader is not longer forced to listen to the alleged authentic voice of a singular author. Through hypertext, the reader is supposedly provided with a bigger picture which enables him to read in a wider context.

2.5 Image Versus Text

However, if one looks at hypertext theory more closely one finds that both Bolter and Landow are not really sure whether alphabetic writing can do justice to the issues of intertextuality, irrespective of hypertext. Bolter (2001, p. 213) asks whether alphabetic text in its current form can survive at all: 'It is fair to wonder whether the late age of print may also become the late age of prose itself.' This unease about the abilities of text is symbiotic with the rise of image-based media during the 20th century:

> Mitchell, and Frederic Jameson seem to agree that we are living in a visual culture. In the Image and the Eye (1982), Gombrich claims that "[o]urs is a visual age. We are bombarded with pictures from morning till night... No wonder it has been asserted that we are entering a historical epoch in which the image will take over from the written word" (p. 13 7). To Mitchell (1994) " ...we live in a culture dominated by pictures" (pp. 2-3), while Jameson (1991) remarks that: "My sense is that this is essentially a visual culture, wired for sound—but one where the linguistic element... is slack and flabby, and not to be made interesting without ingenuity, daring, and keen motivation" (p 299). (Bolter, 2001, pp. 47)

Susan Sontag (1979, p. 241) agrees:

[33] Translation by author. German original: 'autorenlose Texte, die sich gleichsam im Lesen schreiben.'

> That most logical of nineteenth-century aesthetes, Mallarme, said that everything in the world exists in order to end in a book. Today everything exists to end in a photograph.

This chorus of important voices sounds very seductive and it is true, the second half of the 20th century brought TV and photography to a mass market. Magazines, papers and whole cities are loaded with image-heavy adverts. As for digital media, which are at the centre of this investigation of the relationship between text and image, the situation does not appear to be different on the first sight. In the early years of the Web, due to low bandwidth, the application of images was rather restricted. But recent years have seen an upsurge in the usage of visuals of all kind. This is particularly evident in the success of still and moving image archives, such as *Flickr* and *YouTube*, as well as in the heavy use of imagery on social networks, such as *Facebook* or *MySpace*, and last but not least, in virtual environments, such as *Second Life* and *World of Warcraft*, with the latter two being largely image-based or rather *imagin*ary paces.

How does hypertext fit into a media environment which seems to be distinguished by the iconic turn? According to its theory, hypertext sets out to overcome the linear paradigm of the printed codex. But alphabetic notation, as a representation of the spoken word, seems inherently bound to the movement of time and thus linear, irrespective of its use in hypertext. Could it be that a much more radical change was needed to overcome the confines of linear writing? In addressing this issue Bolter and Landow again relate back to poststructuralist thought. Derrida, for example, foresaw the end of linear writing as well as the end of the alphabet. He (1976, p. 87) compares the means of the phonetic alphabet for the usage of writing down modern thought with 'teaching modern mathematics with an abacus'. Thus, Landow (2006, p. 84) refers to 'Derrida's call for a new form of hieroglyphic writing that can avoid some of the problems implicit and therefore inevitable in Western writing systems and their printed versions'.

It seems though, that in the eyes of Landow these demands are met already with the fact that on the Web text and image can be interlinked and on the other hand, with the inclusion of 'nonverbal information' (ibid, pp. 84) such as the cursor in form of an arrow, blinking line or hand. Bolter, though, is not so easy to please. In the second edition of Writing Space (2001), he puts a lot more emphasis on the change in the relationship between image and text caused by electronic media. He questions outright the authority of alphabetical text as an answer to the challenges faced by prose in an au-

dio-visual age. Television and film have surrounded us with a 'visual and aural sensorium' and alphabetical text can simply not compete with these forces. Bolter (2001, p. 6) argues that 'popular prose must now "speak the language" of these [new] media: it must try to turn back into picture writing or pure imagery' (ibid, p. 58). Books, according to Bolter, will survive as the domain for text-based prose while digital media will embrace a mix of both text and audio-visual media and thus 'share in the cultural prosperity of the image' (ibid). To him, the common graphic user interface of the PC, the GUI (figure 3), is a point where pictures turn into 'textual symbols' (ibid, p. 64) and he generally observes that the screen seems to press towards a conflation of text and image into 'a visual unit' (ibid, p. 66). He (2001, p. 73) demonstrates this with the 'splash screen for a multimedia presentation on Arkansas' (figure 1) which he calls an example for a 'buttoned style [which] is about writing with images rather than words' (ibid, p. 72). In this context, it is, according to Bolter, actually a sign of failure if the designer has to fall back on text:

> In the buttoned style, to place more than a sentence or two of text on a screen is an admission of failure, for the assumption is that the designer should be able to deploy a graphic, a video, or perhaps an audio segment to communicate any idea she has. A paragraph of prose is a last resort – to be used when she runs out of ideas, time, or production resources. (ibid)

Landow, in the third edition of Hypertext (2006, pp. 88), similarly highlights the 'significantly pictorial nature' of the Web. And accordingly, to him the demands of early web usability experts, such as Jacob Nielsen, to restrict the amount and size of images used on a website, seem 'bizarre' and biased. He even claims that 'images and other graphic elements are the single most important factor in the astonishing growth of the Word Wide Web' (ibid) as they had turned the Web into an aesthetically pleasing and pleasurable space (ibid).

What is puzzling in this respect is the ease with which men of the written word, professors of language that is, mistrust the written text and how easily they put their trust in the image. It becomes even more puzzling if one looks at the argument which describes how the image actually does this job of transforming the increasing complexity of modern thought. According to Bolter (2001, p. 58), images are more authentic than text. While a text always reflects an individual and thus, limited view, the image, he writes, promises to be much more immediate. It gets by without the 'intermediary

of spoken language' (ibid, p. 59) of which text is a representation. The image speaks for itself without an authorial voice (ibid, p. 59). This sounds familiar as Barthes' announcement of the author's death was mentioned before. To him (1977), the writer is nothing more than a function of language with each text not actually originating in the author's mind but in the possibilities provided by the structure of language itself. In this sense, Barthes describes modern text as 'this immense dictionary from which he [the author] draws a writing that can know no halt'.

If modern writing really is about getting the author out of the way, then the image, in fact, seems to be the perfect match. It is an approach that refers back to what has been said earlier about the relationship between oral and literal. The beginning of written documentation is seen as the beginning of history (Illich & Sanders, 1989, p.3, Ong, 2002, pp. 102) and it is also credited with being one of the factors which helped to support the notion of man as an individual self (Illich & Sanders, pp. 71, Ong, 1982, pp. 101). Before writing there was no history, only myth. The relationship between oral mythological thinking and imagery has already been pointed out. The myth is an authorless text, that is at least as long as it remains in the spoken domain[34]. A text written with an individual and personal voice stands in harsh contrast to the aforementioned participatory images of the myth. Thus, the connection between the suggested rise of the image and the assumed death of the author is obvious. Both are very closely related phenomena which relate back to pre-alphabetic times where neither texts nor authors existed. Bolter (2001, p. 37) acknowledges this backward movement when he sees picture writing to 'gravitate *back* toward the centre of electronic writing' from which the codex had supposedly ousted it for several hundreds of years. Not surprisingly, Barthes himself pleas 'for an oral visual culture' (cited in Nadin, 1997, p. 167). In this context, the question is whether taking refuge in the immediacy and directness of the image is really a solution or whether such an approach is based on wishful thinking. So far it seems the main argument favouring the image is simply the observation of the iconic turn itself. But how, exactly, in technical terms the image is supposed to overcome the increasingly complex circumstances of communication in contemporary society remains unclear.

[34] Homer seems to be the exception but as Parry (1987) has shown, the Iliad and the Odyssey show clear signs of 'oral diction' and thus are most likely subsequent transcripts of traditional oral storytelling.

2.6 The End of Alphabetic Writing

While Landow and Bolter underline what they think is the mostly pictorial nature of the Web and, even though they have clearly heard Derrida's call for a new kind of hieroglyphic writing, they do not offer any explicit vision regarding the future of the phonetic alphabet. Glazier (2002, p. 169) though, goes all the way. He simply calls the 'codex era' an 'aberrant period when text and image were temporarily isolated from one another', while glyphs (Mayan), hieroglyphs or logographic writing systems (Chinese, Japanese) represent normality. Even though he comes to these conclusions, Glazier is not a hypertext theorist. Hypertext theory is predominantly interested in writing in the form of narrative or prose while Glazier's domain is poetry. Having said that, Landow (2006, p. 89) at least acknowledges that poetry might be the more suitable text form for hypertext as it is supposedly less sequential by nature than prose and he (ibid) quotes McGann:

> All poetry even in its most traditional forms, asks the reader to decipher the text in spatial as well as linear terms. Stanzaic and generic forms, rhyme schemes, metrical orders: all of these deploy spatial functions in scripted texts, as their roots in oral poetry's 'visual' arts of memory should remind us (113).

Even though Glazier would certainly agree with this statement, to him (2002, p.20), the hypertext theorists' concentration on what is actually a crisis of narrative offers a 'limited perspective'. He is pointing at one of the main weaknesses of Landow's and Bolter's argument. They are both mainly concerned with electronic writing as it appears on interface level and are not too concerned about the underlying technological structure. For them, the interface is the medium which is actually a way of thinking which refers to the conditions of the print medium. Glazier (ibid) though, has realised that the digital interface bears a strong interrelation with the underlying code, and that code, in itself, is a form of writing.[35] Poetry, so Glazier (2002, p.20), is not so much concerned with narrative than with describing specific textual conditions and an im-

[35] Cramer (2005) underlines that the idea of language as a procedural code is much older than digital computing. His argument is, that there is a long tradition in human culture in which language and text are not seen solely as a communication device but as a force that is able to interfere with the physical world: 'The word made flesh, writing taking up a life of its own by self-execution, has been a utopia and dystopia in religion, metaphysics, art and technology alike' (Cramer, 2005, p. 9). An example is the Jewish mystic tradition of the Kabbalah, which is based on the idea 'that God created the world through language and that even humans possessed the power of influencing things through the academic language spoken in paradise' (ibid, p. 29).

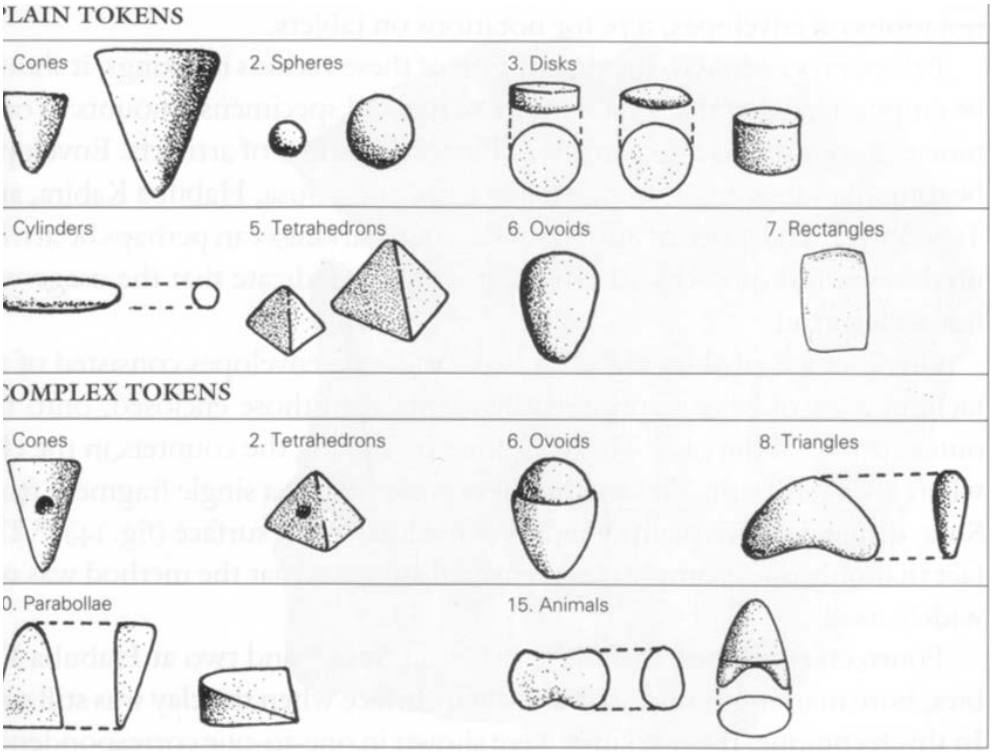
portant part of the textual condition of digital media is code. Thus, the introduction of poetry and code into the discussion about interface language makes sense and is an important part of a more detailed investigation at a later point.

Nevertheless, why Glazier draws the conclusion that the textual condition is such that text will shift towards hieroglyphic writing remains unclear and it will be demonstrated in detail later that all justifications for such a claim fall short. Glazier's awareness of the importance of code and programming should have made him cautious in this respect. Code needs to be based on discrete symbols in order to function. The machine only understands either/or, on and off. The increasing semantic ambiguities which come with the connotative richness of imagery and which would be a consequence of hieroglyphic writing are not necessarily what the computer as a writing tool would encourage. Not surprisingly, Kay (1990), one of the pioneers of the PC and the GUI, refers in detail to his struggle in trying to develop icon-based programming languages. It is also very interesting that the examples of websites that Glazier quotes in favour of his argument are mostly from around 1997, when the web was still very young. The same can be said about Bolter's choice (figure 1). Ten years is a very long time with regards to developments in the digital domain and one of the points this thesis makes is that a lot of the theory favouring a shift towards a pictorial approach to writing was written under the impression of certain developments and trends which did not necessarily reflect the true state of the medium. Chapter five points out, that these kinds of interfaces are actually concealing the condition of the digital domain rather than revealing it.

Nevertheless, Glazier raises two very interesting points. First of all, he brings to the fore that text is not only about time-bound and thus linear narrative. Aarseth (1997, p. 26), with reference to Hjelmslev similarly argues that hypertext theory suffers from an outdated structuralist axiom in that 'for semiotics, as for linguistics, texts are chains of signs and, therefore, linear by definition'. To him (ibid, p. 63), the codexical work is neither linear nor non-linear but allows for random access; a fact that anyone who has ever skimmed a newspaper or a scientific text can hardly deny. He argues (ibid, p. 78) that hypertext to the contrary is much less open to different reading paths as its author has a much stronger control over the access points to the text, or links for that matter, than a writer of a novel. In that respect, the digital text is even much more sequential than the book. The other point that Glazier raises is the inclusion of programming into the discussion, opening up a totally new perspective which both Landow and Bolter have neglected.

In Flusser's (2003) ontology of media, programming also plays a very distinct role. Human communication moves from the real and three-dimensional world into the two-dimensional sphere of the image which depicts and conjures the real world. Writing, though, helps man to move out of the mythological realm of the iconic and into the discursive, reflective sphere of text, the aim of which it is to criticize the image. The final step which the world is experiencing now according to Flusser is that electronic media, and specifically computing, pushes towards the zero-dimensional realm of mathematical abstraction; the world is dissolved into algorithms which can be resembled on demand in any imaginable way (ibid). The 'rebellion of the digits against the letters' as Flusser (ibid, p. 78) calls it, results in the linear line of the text dissolving into pixels on the screen. And while text only criticises the world, the algorithm is able to construct new, alternative worlds. Bolz (2006) takes ideas of reconfiguration and recreation even further when in his design-manifesto for the 21st century he claims that humanity has reached a point where design takes an active role in actually reengineering all aspects of life, including our own biological and neurological system. Interfacing, according to Bolz, will go beyond spoken or written language as it will come to a point where finally 'we can use the computer with "natural" gestures – we do not need to write programmes any longer, but we move in an apparent data space: it will be sufficient to point ones finger'36 (p. 63). These visions provide an interesting alternative to the back-to-the-image argument. In that sense, the next step from linear writing would not lead to a regression into the image but to a process of procedural writing or coding, which then transforms the interface in whatever way is needed, be it text, image, virtual space or diagram.

36 Translation by author. German original: 'Im Cyberspace können wir den Computer schließlich mit „natürlichen" Gesten bedienen – wir müssen keine Programme mehr schreiben, sondern bewegen uns in einem anschaulichen Datenraum. Es genügt jetzt, mit dem Finger zu zeigen.'



ıre 12: Abstract clay tokens used to represent farming produce in the Neolithic in Mesopotamia. They are the key to a ɔry that sees writing emerge from abstract symbols used for counting rather than from picture writing. age source: Schmandt-Besserat, 2006, p. 49)

2.7 The Beginning of Alphanumeric Writing

While Bolter and Landow have been criticized for their fixation on the narrative aspects of writing, the history of writing seems to support them. It seems evident that the origin of phonetic writing lies in a narrative use of images that has undergone a slow process of abstraction. This theory was established by Warburton in 1738 (cited in Schmandt-Besserat, 2006, p. 1) and shines through in the work of Bolter and Landow. But the idea has recently been challenged. Schmandt-Besserat (ibid) has made a strong case that Mesopotamian writing as the originator of all European and Indo-Asian writing systems, has actually not arisen from picture stories but has 'emerged from a counting device'. Bones and stones have been notched, at least since the ice age, 30000 years ago in order to record lunar cycles (Hobart & Schiffman, 1998, p. 35). And when Neolithic societies turned from hunter-gatherers into sedentary farming communities, administration of storage, livestock and merchandise became a necessity (Schmandt-Besserat, 2006, p.7). From around 8000 BC, abstract clay tokens in various forms were used to represent farming produce (figure 12). One method of storing those tokens was to put them in clay envelopes. The envelopes would be marked with the shapes of the included tokens in corresponding number to the content. At some point in history the tokens were omitted and later the hollow envelopes turned into tablets once the accountants realised that the markings on the envelope would do as representations as well without the content in the envelopes (ibid). These markings became a system of their own which developed to include not only impressed markings but more legible signs traced with a pointed stylus. Both types of symbols, which derived from tokens, were picture signs or pictographs. They were not, however, pictographs of the kind anticipated by Warburton. The signs were not pictures of the items they represented but, rather, pictures of the tokens used as counters in the previous accounting system (ibid, p.7).

The next step was the development of various versions of one symbol representing different amounts of the specific goods in question. From these symbols abstract numbers emerged. Early cuneiform writing, so-called proto-cuneiform, was a mix of 'pictographs,... symbols, emblematic signs and signs from the appropriate number system' (Hobart & Schiffman, 1998, p. 41). Hieroglyphic writing is also a mix of very abstract, even alphabetic and logographic elements (The New Encyclopaedia Britannica, 15th edn, Macropedia, volume 29, pp. 1036). All this evidence indicates that the theory of a soft shift from pictorial to phonetic writing is at least questionable (Hörisch, 2004,

p. 95). It is more likely that humans, at an early point of civilisation, realised the effectiveness of highly abstract symbols in order to frame information which did not necessarily have to be related to narrative.

Not surprisingly, the overwhelming majority of remaining Cuneiform scripts – the earliest known writing whose origins date back to 3500 B.C – are lists (Ong, 1982, p. 99). Hence, Hobart and Schiffman (1998, p. 45) observe that the beginning of writing in Mesopotamia concurs with an 'explosion of an urge to classify'. By far the largest amount of tablets from the royal library at Nineveh from around 650 B.C. consist of so called *omen texts*, as well as word and sign lists for translation and writing educational purposes and other small textual units such as conjurations, proverbs and fables (ibid, p. 45). To Ong it is clear that writing was developed for the purpose of list making (1982, p. 99) while Hobart and Schiffman (ibid, pp. 62) go even further when they claim that narrative originally is a feature of oral expression. It provides a structure around which oral societies, which have no other means of tradition of knowledge, can be organised. These societies are constructed and sustained around orally handed down narratives which unfold in a sequential, diachronic process, which are the aspects that dominate their language (ibid). Classifying, in contrast, 'describes atemporal, synchronic relations between entities' (ibid). Thus, narrative is actually an 'enemy of classification' (ibid) because it suppresses the human urge to classify. The early cuneiform scriptures, but also the genealogies of Hesiod, as Hobart and Schiffman further argue, show that writing actually frees human language from the fixation with narrative and reveals 'its classificatory potential' (ibid, p. 41). A look at the endless genealogies of the Old Testament supports this point of view.

This is a very interesting reinterpretation of media history. In the face of this argument, the orthodox view that oral societies think in non-historic, non-linear and synchronous patterns, while literate societies are poised for a more historic, linear and diachronic mode, is too simplistic. On the contrary, oral cultures are actually relying on linear narrative patterns as a means of commemoration while writing as a medium frees the human mind to follow the urge for more comparative and synchronous forms of language. This theory is confirmed by Schmandt-Besserat's findings that writing actually emerged as a result of the increasing need to document stock and ownership structures. The livestock had to be categorized according to breed, size and gender, the crop according to type, and all had to be assigned to an owner or taxpayer. Such tasks were questions of two-dimensional layout rather than linear narrative. And Hobart's and Schiffman's notion also complies with the idea that writing was a necessary pre-

requisite for Western Science. At least, that is if one sees science as an approach to dissect, compare and analyse the world rather than of narrating it. There is evidence for this in Plato's (1970) Phaedrus, the text which was the starting point of this chapter. Socrates expresses his appreciation for the classificatory potential of language: 'the second principle is that of division into species according to the natural formation... I am myself a great lover of these processes of division and generalization'. Thus he lays a foundation on which Aristotle (1938) heavily extended at a later point and on which ultimately Western science rests. This argument further undermines the starting point of hypertext theory, which sees linearity as a basic property of the written text.

2.8 Iconic Writing Systems

The argument that pictures make the superior text because they supposedly free the content from its fixation on the linearity of alphabetic writing becomes less convincing against the backdrop of what has just been laid out. Alphanumeric text has a strongly synchronic and comparative side to it. And there is further evidence that writing with images is not unproblematic. In this context, it makes sense to briefly refer to the origins of the study of signs. Peirce (1932, 2.228) uses *sign* as an umbrella term for 'something which stands to somebody for something in some respects or capacity', a representation, that is. In his sign theory, the icon is a specific sign which resembles what it stands for, such as the bin on the computer desktop resembles a bin in real life. A symbol, on the contrary, for example letters or words, has no visual resemblance to the signified at all (ibid, 2.247). This is meant when Bolter (p. 59) argues in favour of the immediacy of the image. The image is seen as something which reveals its content rather unmediatedly and instantly, much in contrast to the abstract letter. De Saussure's notion of the sign will give some hints as to why this is a fallacy, a fact that is discussed in the next chapter in more detail. For him (1974, pp. 66), the sign consists of a signifier and a signified, the first being the 'sound image' while the second stands for the 'concept'. Thus, for Saussure the sign's functionality stems not from its resemblance of reality but from its connection with language, the sign being a representation of a linguistic term or expression. An image, though, and this includes iconic images, is connotative by nature (Flusser, 2003, p.73). This means it is not necessarily connected to one specific linguistic term which makes it extremely difficult to function as part of

a language[37]. The reader has to constantly decide on the right connotation. And as soon as the sign represents a specific word in order to suspend the confusion, it inevitably turns into an annotation system for spoken language where the visual representation becomes secondary.

A good example is the Chinese writing system which is mentioned by Glazier (2002, p. 169) as one of the antipodes to alphanumeric writing. DeFrancis (1984) clearly shows that the idea of Chinese being foremost an ideographic form of writing, a sign system which represents ideas rather than sounds, is a total myth. 'Chinese characters represent words (or better, morphemes[38]), not ideas, and they represent them phonetically, for the most part' (ibid, p. 145). He (1984, p. 143) further argues that any writing system combines phonetic with semantic elements. Alphabetic writing, for example, does not only contain letters but also punctuation marks which are not necessarily expressed phonetically. However, DeFrancis (ibid, p. 144) comes to the conclusion that in order to function, any sign system has to be predominantly phonetic. This, he notes (ibid, pp. 145), had actually been pointed out by Du Ponceau and Callery in the 19th century but is mostly overlooked. At that time, the hieroglyphs had finally been deciphered and it had been found that they, as well as Chinese characters, are, 'for the most part, nothing but *phonetic* signs, that is, signs destined to represent the different sounds of the language' (Callery, quoted in DeFrancis, 1984, p. 146). Why writing systems have to be predominantly phonetic is simply for practical reasons:

> Alphabetic writing requires mastery of several dozen symbols that are needed for phonemic representation. Syllabic writing requires mastery of what may be several hundred or several thousand symbols that are needed for syllabic representation. Ideographic writing, however, requires mastery of the tens of thousands or hundreds of thousands of symbols that would be needed for ideographic representation of words or concepts without regard to sound. A bit of common sense should suggest that unless we supplement our brains with computer implants, ordinary mortals are incapable of such memory feats. (ibid, p. 144)

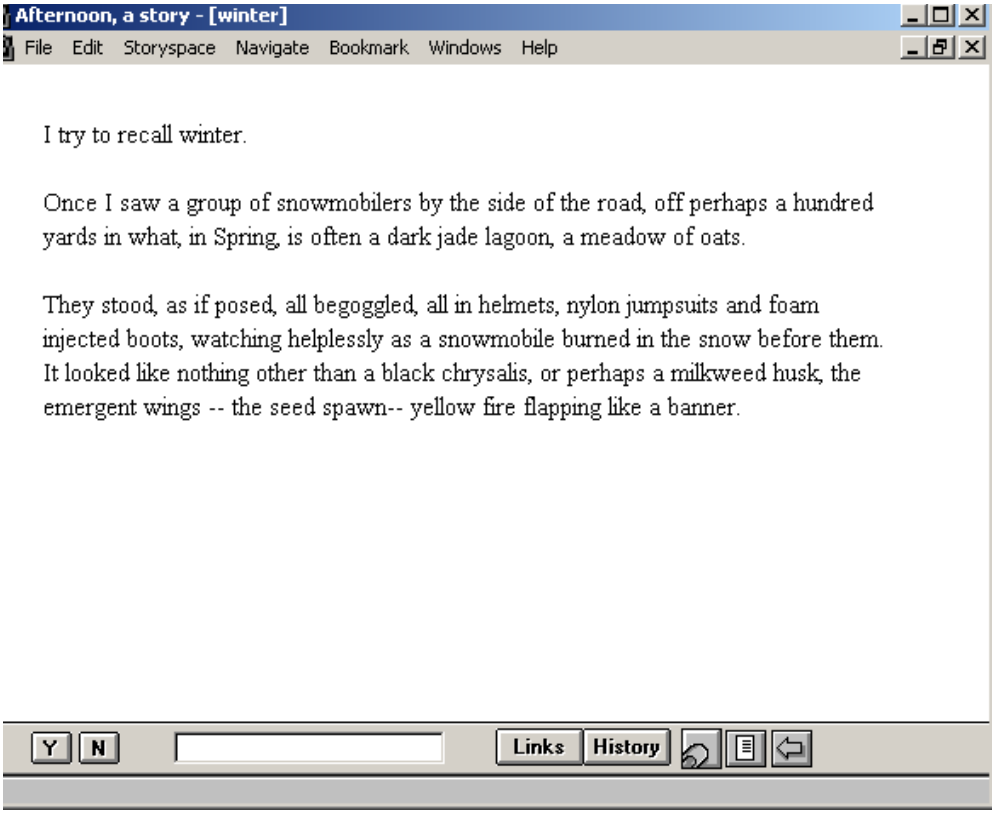
[37] This does not contradict Saussure's (1974, pp. 67) idea that all signs are by nature arbitrary, with their meaning determined by cultural context. A sign can have a very specific and clearly defined denotation, while the meaning still remains arbitrary.

[38] A speech element having a meaning or grammatical function that cannot be subdivided into further such elements ('morpheme', 1991, *Collins English Dictionary*, third edition)

But if all writing systems are predominantly phonetic, this means that any writing system foremost refers to the flow of spoken language and therefore, the idea that image writing could counter this behaviour has no basis. Image-based writing systems are faced with a Catch-22. They are constructed of highly connotative building blocks. In order for these elements to function as constitutive elements of a language at all, the pictograms have to lose some of that ambiguity. Accordingly, more and more of the analogy to the real world has to be abstracted from each sign. It moves away from the connotative richness of an image towards the discreteness of an abstract symbol, such as a letter. They turn from icons into symbols. Or speaking in the terms of Kay (1990) and Bruner (1966), at some point a complex sign system, such as the hieroglyphs, disconnects from the iconic mentality which it tries to capitalise on in the first place. Naturally, during that shift the pictogram looses whatever advantages it has had compared to abstract symbols and its relationship to the real world. The huge amount of signs of which the pictographic language is comprised, render it a complex and massive aggregation of abstract symbols, incapable of capitalising on the advantages of abstraction either.

2.9 Linearity and Multi-linearity in Hypertext

The recent two subchapters were a critique of the idea that image writing is actually a superior form of writing. It was mentioned that as far as hypertext theory is concerned this idea is built on a very specific notion of text in which text equals narrative. Following this argument to its conclusion, the logical consequence from the equation of text and narrative is that hypertext equals hypertext narrative. The other basic belief surrounding hypertext systems, which has been mentioned earlier, is that print equals linear whilst hypertext equals multi-linear. The idea of multi-linear text has inspired writers to produce hypertext narratives. True to the idea that authorship should pass to the reader, many works of this genre, such as *afternoon, a story* by Michael Joyce (figure 13), offer the user choices in the way he reads the story. Developing a coherent storyline under such circumstances is obviously a challenge. Douglas (2000) mentions that it is difficult to overcome the classical narrative traditions based on the allocated roles of author and reader. She acknowledges though, that this allocation is not as clear-cut as it seems. Even in classical narratives there are lots of gaps for the reader to fill in, which he is happy to do, as humans have an innate tendency to built causal con-



ıre 13: *afternoon, a story*, a hypertext narrative by Michael Joyce. The story exists of multiple text fragments. Almost word in any of the texts is linked to another fragment. Thus there are many ways to navigate and read the story. (Image rce: screenshot from Joyce, 1987)

nections between events as a way of ordering their experience (ibid, p. 65). In movies, according to Douglas (ibid), viewers constantly 'create the illusion of continuity, sequence, and causation' (ibid) where there is actually only a very quick sequence of still images. The problem with hypertext narrative, states Douglas, is that very often the gaps are too big and the whole experience proves 'disorientating (ibid, p. 73). Thus, hypertext narratives often turn out to be 'challenging, frustrating, puzzling, even occasionally utterly defeating (ibid, p. 126)'. Johnson (1997, pp. 126) similarly complains about a fragmented and unsatisfying reading experience with regards to Joyce's *afternoon, a story*. While hypertext theory argues that this is the new form of reading and writing, which is long overdue, the audience seems to be rather helpless in dealing with this kind of textual construct.

It is quite telling that hypertext as such is extremely successful but hypertext narrative or rhizome fiction, as Murray (1997, pp. 132) calls it, has not really gone mainstream. This does not necessarily disqualify it as a genre and the hypertext theorist might argue that the audience simply has not yet developed the skills to deal with this new cultural form. A different interpretation would be that writing for hypertext is simply not what hypertext theory thinks it is. McKnight, Dillon and Richardson in 1991 (pp. 16) already made very clear that the equation of written text with linearity, which positions hypertext as an antipode to print, is oversimplistic. Aarseth's approach towards text confirms this view. Coming from a game theory perspective he (1997, p. 3) is, similar to the poet Glazier, interested in the materiality of text, thus focusing not on 'what was being read' but 'what was being read from'. In that sense, text turns into a material which has specific properties and can be treated accordingly. Text itself is a machine, 'a mechanical device for the production and consumption of verbal signs' (ibid, p. 21) The aforementioned properties describe how, through the process of operating any kind of textual machine, these signs or *scriptons*[39], reveal themselves to the reader (ibid, p. 62). They include such terms as *dynamics*, *determinability*, *transi-*

[39] Aarseth (1997) defines scriptons as follows: 'Information is here understood as a string of signs, which may (but does not have to) make sense to a given observer. It is useful to distinguish between strings as they appear to readers and strings as they exist in the text, since these may not always be the same. For want of better terms, I call the former scriptons and the latter textons. Their names are not important, but the difference between them is. In a book such as Raymond Queneau's sonnet machine Cent mille milliards de poemes (Queneau 1961), where the user folds lines in the book to "compose" sonnets, there are only 140 textons, but these combine into 100,000,000,000,000 possible scriptons. In addition to textons and scriptons, a text consists of what I call a traversal function-the mechanism by which scriptons are revealed or generated from textons and presented to the user of the text. Scriptons are not necessarily identical to what readers actually read, which is yet another entity (a lexie in the barthesian sense?) and one not determined by the text. Instead, scriptons are what an "ideal reader" reads by strictly following the linear structure of the textual output.'

ency, *access*, *linking*, *perspective* and *user function*[40]. It is very important that these properties do not refer to a specific medium but simply describe the material quality that offer itself to the user while moving through it. Astonishingly, linearity and non-linearity are not part of this set of properties. To Aarseth, the use of terms like 'nonlinear and multilinear' (1997, p. 59) actually shows a lack of rigour as non-sequential and even rearrangable layouts of text are not a privilege of digital writing and thus, cannot be alloted to a specific medium. Among the examples he cites are the aforementioned Talmud (figure 10), with its comments dispersed around the main text, or the Chinese I-Ching, an ancient collection of divinations which are randomly rearranged with every call of the oracle. Thus, Aarseth (ibid, p. 78) concludes that the prevalent notion of hypertext as a fulfilment of postmodernist ideas of *tmesis* is a myth:

> For Roland Barthes, tmesis is the reader's unconstrained skipping and skimming of passages, a fragmentation of the linear text expression that is totally beyond the author's control. Hypertext reading is in fact quite the opposite: as the reader explores the labyrinth, she can not afford to tread lightly through the text but must scrutinize the links and venues in order to avoid meeting the same text fragments over and over again (this typical of afternoon). Only a linear text sequence (with intransient temporality) can be read in a free tmesic manner, as the reader is free to skip passages defined entirely by him.

Aarseth finally revokes the idea that narrative has undergone some kind of superior refinement through the introduction of non-linear hypertext. To him (ibid, pp. 84) the rather obvious absence of plot and story in a lot of hypertext literature simply turns it into an alternative genre with its own rules. Thus, he diverts the attention from a fixation on specific orders of text towards varieties of text genres which simply deal with text in different manners. In that sense, hypertext literature is not another variation of narrative but a separate genre:

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40 Dynamics: describing the possible changes in the amount and content of text elements.
Determinabilty: describing the flexibility in the relationship of the text elements to each other.
Transiency: describing the ability of a text to change without the user's intervention.
Perspective: does the text force the user take on a specific perspective (play a specific role) such as a character in a role playing game?
Access: how much of the text is accessible at any given time?
Linking: if specific text-elements are linked to each other how are these links defined?
User-functions: What are the activities that the user has to undertake to support the performance?
(Aarseth, 1997, pp. 62)

> Bolter, commenting on Joyce's Afternoon, is on the right track: "We could say that there is no story at all; there are only readings" (1991, p. 124). Thus hypertext is not a reconfiguration of narrative but offers an alternative to it. (ibid, p. 85)

Hypertext literature is a genre which breaks text into various chunks and leaves it to the reader to reassemble those parts. The Web though, is not at all organised in such a manner. To the contrary, it is full of self-contained, clearly structured and ordered texts. Whether the reader wants to traverse the text in the way designated by the author is left to each individual reader. And this is neither new nor a specific property of hypertext as newspapers, magazines or even books can be treated in the same way.

2.10 The Civilization of Illiteracy[41]

The theory discussed so far is very much centred on the media itself and rather indifferent towards the social causes that might encourage certain media or even cause them to evolve. Nadin (1997), to the contrary initiates a very extensive and deep investigation into the social changes which might partake in the shifts that media are currently undergoing. He (ibid, p. 4) indicates that he himself, is a product of east European education which, until recently, was strongly centred on a literacy of the written word and mentions what he thinks to be a strong decrease in literacy in Western culture. A decrease of literacy in this sense is a movement away from alphanumeric text and Nadin thinks that this is the price which humanity will have to pay for striving towards more efficiency, which is a way to describe ‘our striving for more and more at an ever cheaper price’ (ibid, p. 10). Nadin recognizes that the ‘pragmatic framework’ of digital media is one of efficiency, a fact that hypertext theory has signed up to as well even though it does not openly admit it. What else than a question of efficiency was Vannevar Bush, the spiritual father of hypertext, setting out to answer with his Memex? Nadin thinks it plausible that ‘the use of images, moreover of interactive multimedia and network-based exchange of complex data are more appropriate to a faster paced society than texts requiring more time and concentration’ (ibid, p. 27). Bolter (2001, pp. 73) agrees that text is not the appropriate medium to deal with the increasing pressure of modern society:

[41] The sub-chapter heading is borrowed from the title of Mihai Nadin’s book of the same name.

> The use of icons in e-mail and newsgroups suggests that contemporary electronic writers are not interested in the distancing and ambiguity that prose offers and instead want to give their prose the immediacy of a single voice and if possible a face. As Internet technology develops, it seems likely that synchronous and asynchronous video will replace e-mail for many purposes, precisely because video offers to our visual culture the apparent and univocality that prose cannot. Text need not vanish from electronic communication, however: many kinds of documents may continue to be transmitted, but these documents may well be appended to video messages, just as marginalized in the quest for immediacy.

Nadin and Bolter both profess that alphabetic writing will increasingly be marginalized and so Bolter sees it as a given that moving image and sound recordings are the more suitable medium for personal exchange. As such features nowadays are technically rather unproblematic it is worth asking whether Bolter's vision has materialized.

The facts provide a clear message. Email, for example, is still predominantly text-based and has not yet been replaced by video messages. The news that in December 2006 more than four billion SMS text messages were sent in the U.K. alone (Text it, 2007) is not actually an indicator that alphanumeric writing is on the retreat either. Stefana Broadbent (2007), who over several years has visited, interviewed and monitored 250 households each year to examine contemporary communication behaviour patterns has actually come to the conclusion that 'written communication prevails' as 'more than 60% of all [mediated] exchanges are in written form'.

Why do people prefer writing in personal exchange? It is hard to imagine a more intricate interface for writing than the tiny keypad of a mobile. Nevertheless, millions of people use it on a daily basis. This is even more astonishing in the face of the fact that with the same device one could easily ring up someone or send the person an image or a movie. There must be something about writing an SMS that in specific circumstances by far outweighs the instant gratification of direct spoken response or the immediacy of an image or a movie. Similarly, VoIP[42] services, such as *Skype*, have not killed instant messaging (IM). Skype itself comes with an interface which allows access

[42] VoIP (voice over IP) is an IP telephony term for a set of facilities used to manage the delivery of voice information over the Internet.VoIP involves sending voice information in digital form in discrete packets rather than by using the traditional circuit-committed protocols of the public switched telephone network (PSTN). A major advantage of VoIP and Internet telephony is that it avoids the tolls charged by ordinary telephone service.. ('VoIP', <http://www.whatis.com>)

to both phone conversation and text messaging (figure 14). The cost argument which might be made in the case of the mobile does not stick in this case. Once the user is online he pays the same whether he texts or talks.

So why do people revert to alphanumeric text when they could speak to someone for the same cost? The advantages of some forms of text-based communication over an immediate spoken dialogue becomes clear if one looks at another very successful form of text-based communication: forums on which whole online communities are involved in discussions or answer help requests. One of the obvious benefits of such a conversation to be led in text, and not in speech, is that the externalisation into text gives the utterances of the speaker a stabile form which frees it from space and time. The dialog can evolve over hours, mostly days and sometimes it is followed up even after months and years. Through the internet, anyone who happens to *pass by* can involve in the discussion at any time. The same is the case with comment functions on blogs, news websites and other platforms. Broadbent (ibid) points out another interesting aspect when she talks about media increasingly turning into a wallpaper of daily life. TV or radio turn into background noise and so does mediated communication. Rather than having to concentrate on a phone call, many users today tend to prefer mediated text communication via SMS or IM which can be done along the way (ibid).

While this explains some of the instant attraction and practicability of text-based communication, the bigger question is why there is a constant and accelerating development of new communication media in the first place. Hörisch (2004, p.275) very poignantly defines communication media as an 'apotropaic[43] magic against absence of any kind'[44]. Sigmund Freud (1930, pp. 47) makes a similar observation when he writes:

> If there were no railway to make light of distances my child would never have left home and I should not need the telephone to hear his voice. If there were no vessels crossing the ocean my friend would never have embarked on his voyage and I should not need the telegraph to relieve my anxiety about him.

At the same time as society physically drifts apart with increasing speed through ever cheaper access to fast transportation, the media make an ever bigger effort to counter that physical movement with an ever increasing amount of virtual communication de-

43 Preventing or intended to prevent evil. ('apotropaic', 1991, *Collins English Dictionary*, third edition)

44 Translation by author. German original: 'Medien sind Abwehrzauber gegen Absenzen aller Art.'

vices. The distance asks to be bridged. It would seem a reasonable response that only the immediacy of the image or even moving image could do this job as it conjures the distant person within eye-spot. But text as a medium has proved perseverant and flexible. The chat client helps to ease the pain of the modern, mobile and lonesome home worker – or PhD student for that matter. New textual niches are the result of an increasingly mobile lifestyle and an increasing pressure to multi-task both in the work space and at home. New forms of textual conversation, such as the instant messenger, forums or blogs, allow for a very flexible response. The communication can fit into one's own schedule and one's own state of mind rather than being forced into an instant and direct one-to-one conversation. Nadin's assumption that an increasing drive towards efficiency will force out alphabetic text has not materialized yet. To the contrary, the need for efficient communication has produced many new forms of text-based exchange.

In this respect, Walter Ong's (1982, p. 135) notion of a movement towards 'secondary orality'[45] is of great interest. In the times before personal computing 'telephone, radio, television and various kind of sound tape' had, as a matter of fact, regained some territory from the written word and repositioned orality as a mass medimedium. Thus, so Ong, humanity is somehow entering a second age of orality which differs from primary orality through the fact that it is based on the knowledge of literacy. While Ong's writing explicitly refers to audio-visual and auditory media, Walter (2006) quotes from a later interview in which Ong supposes that it is the instant availability of the written text which produces a kind of immediacy which positions digital media very close to oral culture. While printed text is a storage medium and thus, always reaches from the past into the present, new media has accelerated written text to an extent that it comes close to the spoken word. Most vividly so in chatrooms and virtual worlds, such as *Second Life*[46] (figure 15), where, for example, the virtual charac-

[45] It is called *secondary* orality, because, according to Havelock (1986, pp. 63), primary orality can only exist in the total absence of writing. A literary culture will necessarily rely on metaphors and concepts of writing to explain orality.

[46] 'Second Life is a massive multiplayer universe (MMU) set in a 3D virtual world created by San Francisco-based software maker Linden Labs.
Second Life was founded by Philip Rosedale. Rosedale intended the virtual world to closely mirror the "metaverse," a 3D version of the Internet set in the near-future as described in the cyberpunk novel "Snow Crash" written by Neal Stephenson. Residents can design and build residences on land that they own or rent from either Linden Labs or other residents. There is a high level of entrepreneurial activity in Second Life. As of late 2006, hundreds of thousands of dollars were changing hands daily as residents created and sold a wide variety of virtual commodities.' ('Second Life', <http://www.whatis.com>) It should be added that residents can also create their own 3D avatars with which they can move through Second Life.

ıre 15: *Second Life* is a virtual social environment in which users are represented through self-created avatars. Commu-
ıtion between the avatars is currently text-based and so whenever an avatar involves in a conversation his hands are
ving through the air as if they were typing on a keyboard, just as the female character does in the middle of the picture.
s is a visual feedback feature to show the user that his dialogue partner is about to respond. (Image source: screenshot
n the application Second Life)

ters, mute as they are, wildly type into invisible air keyboards to express the fact that their master is currently typing.

Some writers have taken up Ong's idea of secondary orality, applying it to text based digital media (Fowler, 1994; Dekker, 2002). Fowler (1994), for example, claims that hypertext shows clear similarities to the usage of language in oral cultures, such as fluidity, immediacy, collaborative effort, indeterminacy and homeostasis[47]. Even though there remains some unease about the usage of the word *oral* when it comes to describing properties of text[48], it is undeniable that recent years have seen massive changes in writing culture. Through the Internet and text messaging, alphabetic writing has not only regained territory from verbal communication but orthography and grammar are affected. SMS has developed its own shorthand (Norbrook, 2003) and the Internet as a whole seems to abet a slack attitude towards the formal aspects of writing (Barkham, 2006). Patronized by spell check software, and encouraged by the ubiquity and flexibility of the digital written word, combined with the ease of copy and paste, the digital writer is less concerned about the preciousness of his prose. Digital data have a rather short half-life period additionally encouraging orthographic and grammatical sloppiness. As the Web has become a many-to-many publishing media, there is no publishing authority that could enforce a certain standard of written language. Great amounts of written digital text take on more and more of the properties of the spoken vernacular simply for the fact that more and more conversation is conducted digitally via text.

The alphabet as a writing system is just not finished yet, not in the print domain and not in the digital domain. In the year 2004, 375.000 new English book titles alone reached the shops worldwide (Bowker.com, 2005) while in the year 2006, around 75 million people were keeping a blog (Sifry, 2007), admittedly a medium that allows for the mix of text and image but very often text outweighs the images and more than one blog has turned laymen writers into published book authors[49] (Pradhan, 2007). Digital media are a massive catalyst for various new forms of communication but contrary to the aforementioned predictions of a loss in alphabetic literacy, for the time being,

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47 Ong (1982) describes oral cultures as *homeostatic*, meaning that they tend to live in the present and without a deeper historic consciousness.

48 Arguing that oral tradition and literature are mutually exclusive concepts Ong (1982) heavily criticizes the term 'oral literature'.

49 A recent example from the UK is Tom Reynolds who runs the blog *Random Acts of Reality* (<http://randomreality.blogware.com>) from which the book *Blood, Sweat and Tea: Real Life Adventures in an Inner-city Ambulance* (Reynolds, 2006) evolved.

more and more communication and conversation is conducted as text and forced onto the network.

2.11 Conclusion

It is undeniable that modern society is speeding up and confronting the individual with increasing challenges. Why this should lead to a retreat of alphabetic communication in favour of the image is very unclear. The notion that some kind of image writing or iconographic writing could dissolve the linearity of phonetic annotation and lead to a more rhizomatic structure of text is partly based on a misunderstanding of certain writing systems such as Chinese and hieroglyphs. They are phonetic notation systems to a large extent as well and thus, bound to spoken language. It is true though, that in human communication there is a need to express oneself in the form of two-dimensional mappings as well as in time-based manner. This refers to human experience in the world where things do not only move through time but also have a spatial position. The notion though, that the image is responsible for the two-dimensional aspects of things while text has to serve the time-based narrative aspect of language, falls too short as alphabetic writing does not simply serve purposes of linear narrative – a gesture of stringing together events – but it is at least as much a driving force behind comparative thinking, the juxtaposition of things that is.

Digital media speed up text to a great extent, resulting in a very interesting new mix of features: like its analogue predecessor digital text combines the directness of the spoken word with two-dimensional layout and the ability to store over time. It adds to this package automatic search functions and the possibility to constantly and easily reedit any text. This abundance of features makes digital alphabetic text a quite powerful tool. Accordingly and judging from the rise of many new text-based communication forms of recent years, such as SMS, forums, chats, wikis and blogs, text still seems very much alive. It is a fallacy to believe that image writing or any kind of movement towards the image could be an easy way to overcome increasing complexity. To the contrary, the image is an intrinsically more archaic form of communication which is discussed in more detail in the next chapter. Images and imagination are very important assets but one would think that dealing with growing complexity is at least as much a matter of increasing analytical skills, techniques of comparison and categorisation which belongs to the domain of denotative code. In this respect, it would

probably make much more sense to give attention to programming as a new kind of emerging literacy rather than to simply fall back on the image.

Also, the notion that digital media in general promote a kind of authorless writing is very difficult to uphold. It looks more as if through the Web, Andy Warhol's idea of fifteen minutes of fame for everyone is coming true. It is a many-to-many medium where everyone can publish whatever he wants and where everyone obviously does exactly this. Everyone has become an author. In more general terms, the idea of the authorless text has been concisely rejected by Burke who, in 1992 (p. 160), reflected on the achievements of the likes of Derrida, Foucault and Barthes and states that no contemporary writer has reached a similar 'authority that their texts have enjoyed over the critical establishment in the last twenty years or so'. Ironically, the proponents of the authorless texts are among the most distinct authors of their time.

Another point that has pervaded this chapter and plays a further role is the relationship between human communication tools and specific patterns of thought or specific mindsets. The simple fact that the spoken word vanishes once it is uttered makes for a totally different kind of communication compared to the word or the picture which has been written down. And the abundance of visual information in an image definitely makes for different reading than the purity of alphabetic text. However, this does not mean that humanity is determined by its media, as the reading of McLuhan (1962; 1964) might suggest. Media have been invented by humans and Plato's Phaedrus is probably one of the earliest texts which shows how media both encourage particular mindsets, but are also there to serve them. The next chapter demonstrates further the ways in which the needs of a society and its communication tools affect each other in an iterative process.

3.0 READING: LANGUAGE AS A SYSTEM

3.1 Introduction

The last chapter was an investigation of different methods of writing and their relationship to the image but also how they might take part in shaping human understanding of the world. This chapter inverts the perspective. It asks why symbolic systems have been developed in the first place and what they can tell about human interaction with the world. In the course of this chapter it becomes clear that the discourse in favor of the image and image writing is actually not so much driven by the superiority of iconic communication but by delusions about its possibilities.

3.2 Man as a Machine – About not Perceiving the Environment

The proponents of pictorial communication attach all kinds of attributes to the communicative power of the image. Stephens (1998, p. 61) thinks it is 'marvellously accessible' and 'concise'. Bolter talks about its 'cultural prosperity' (Bolter, 2001, p. 6) and its 'immediacy' (Bolter, 2001, p. 59; Bolter & Grusin, 2000, p. 11). In the reverse, the text is blamed for its abstractness (Stephens, 1998, p. 63). Two things should be acknowledged in this context. First, if this criticism is directed at writing, it is also directed at human language in general because alphabetic writing is an annotation of the spoken word. And, if this is the case, then this also implies that images contain or reflect specific properties which do not necessarily have to be expressed through language. Lakoff (1987, p. 266) calls this the 'objectivist approach' towards linguistics. Objectivism, according to Lakoff (ibid, pp. 159), assumes that human language is about the manipulation of abstract symbols, just like computers manipulate the digits 0 and 1. It further assumes that a meaningful relationship between these symbols and the real world is based on a reality that 'comes with a unique, correct, complete structure in terms of entities, properties, and relations' (ibid). Humans do not have any part in creating this structure of 'entities, properties and relations'. They simply perceive existing structures, attach abstract symbols to the objects and relationships in the structure and then manipulate these symbols via language (ibid). In that sense, images and iconic representations stand in for the real world, carrying with them the inherent properties of this world. The more realistic the imagery, the more properties can be secured.

Objectivism views the brain as a place where information is perceived via the senses, as well as manipulated and stored. Such a view is not uncommon at all. The current vernacular understanding of cognitive functions is very much based on metaphors lending from computing and information theory. Rheingold (2000, pp. 248-249), for example, refers to himself and his fellow humans as 'human information processors' and Hinton (1992, p. 105) simply states that 'the brain is a remarkable computer'. Lakoff (1987, p. 338) calls these kind of descriptions the mind-as-machine metaphor. The concepts in which a society understands the human being seem to have always been very closely related to the predominant technologies of the respective time. Krieg (2005, p. 2) specifies that the Judaic myth of the creation of mankind from clay – 'god's robot' – relates to contemporary means of technology: the art of pottery. And while the age of industrial manufacturing, similarly true to its means of reproduction, dreams up artificial intelligence embodied in assembled androids such as Frankenstein's monster or Fritz Lang's Maria, the belief is now that cognition is simply a function of the brain with computing and the computer its artificial equivalents; so much actually that the computer has become 'the preeminent metaphor for understanding human cognition' (Thelen & Smith, p. 1994, p. XIX).

From a neurological point of view, the first problem with the objectivist approach is that the brain simply does not work this way.

> Images are not stored as facsimile pictures of things, or events, or words, or sentences. The brain does not file Polaroid pictures of people, objects, landscapes; nor does it store audiotapes of music and speech: it does not store films or scenes in our lives. (Damasio, 1995, p. 100)

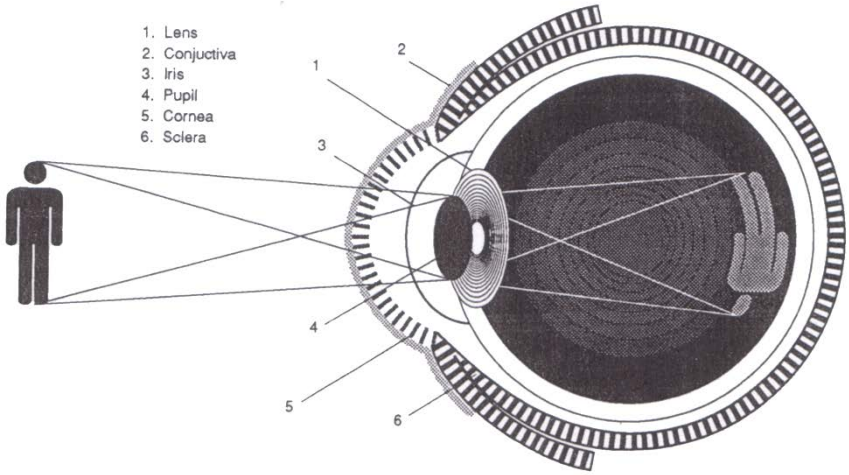
If this sounds counterintuitive, it might be worth considering for one moment the human brain, effectively, as a container for storing information and the consequences. The fact is that this would result in nearly instant information overflow because of the enormous amount of sensations that humans are constantly exposed to via their skin, eyes, ears, nose and mouth (Krieg, 2005, p. 40). Forgetting is an inherent part of human thinking, while computers have to be forced to forget. The brain is not simply a central processing unit operating on symbols via Boolean logic. Looking at alternative models of understanding human cognition, it becomes clear that there is an even bigger question mark behind the objectivist approach when it comes to the notion of semantic properties attached to the world, and conveyed via imagery. The problem is

that the human brain does not receive images in the first place. The whole concept of the brain being a processing unit which receives inputs and outputs is at least very questionable. In the 1970s, the neurobiologists and philosophers Maturana and Varela came up with a fascinating new model of the workings of organisms which presented an antithesis to these traditional concepts based on input-output[50]. They claimed that living organisms are complex systems whose aim is to stay in an inner equilibrium despite changing conditions in the environment, a process they call 'autopoietic organisation' (Maturana & Varela, 1987, pp. 43). This equilibrium is not an absolute one, like in a computer which always moves back into default settings and default constellations, but it is achieved via an ongoing readjustment of the system from the inside in relation to the perturbations from the outside. The organism is structurally coupled (ibid, p. 187) with the environment but it actually neither perceives inputs from it nor does it produce outputs into it in the way the computer metaphor which is used to describe the brain, would account for.

An example to explain this in more detail is the traditional eye-as-camera metaphor. Many people might remember the schoolbook illustrations of the eye which, like a camera, mirrors the image of the outside world upside down through its lens, captures this image on the retina and sends the information to the brain (figure 16). This analogy only adds up as far as the light reaches the lens. From the moment it touches the retina, everything is different. Maturana and Varela (ibid, pp. 161) explain that each retinal neuron which is projected onto the visual cortex of the brain has to go via the thalamus[51] where it meets hundreds of other interfering neurons coming from other parts of the neural system. Additionally, some of these neurons interfering with the incoming signal are actually projecting from the visual cortex itself back to the corpus geniculatum laterale. What is passed on to the visual cortex is not an exact impression of the outside world but a complex and reciprocal mix of signals from the inside and outside. The cognitive psychologist J. J. Gibson's (1966, pp. 155) similarly dismisses the idea of humans receiving inputs or images. Arguing from the point that perception is part of a bigger ecological system, he states that animals do not simply have eyes in order to perceive objects, he actually claims that, strictly speaking, there is

[50] This model has been slowly finding its way into computer science during the last thirty years as a way to understand the differences between computing and cognition. Winograd and Flores (1986) for example referred to it in their groundbreaking book *Understanding Computers and Cognition*, as did Krieg (2005) in his recent work *Die paranoide Maschine* (The *Paranoid Machine*).

[51] 'Either of two masses of grey matter in the forebrain, serving as relay stations for sensory tracts' ('thalamus', *The Oxford English Reference Dictionary*, 1996, second edition).



ıre 16: This image illustrates how light enters the eye through the lens and is then projected onto the back of the eye, the ıa that is. This might lead to the conclusion that visual perception is somewhat comparable to taking a picture with a ıera. However, once this information has reached the visual cortex of the brain, it has little to do with the original input. fair to say that the brain constructs the image rather than receiving it. This insight challenges the notion of the image as ıg a more direct and 'concise' (Stephens, 1998, p. 61) form of information about the environment than language. (Image rce: McKnight, Dillon, & Richardson, 1991, p. 46)

nothing to be seen at all (ibid, p. 172). Organisms are embedded in an environment which provides specific properties, such as for instance surfaces of various structures, gravity, different states of matter, rays of light, sound waves, specific temperatures. They have learned to use these properties in order to operate in this environment. Various animals utilize very specific aspects of these properties. The bat, for instance, is receptive for specific ranges of sound humans can not hear and dogs have a more distinct perception of gaseous matters than humans. Thus, the visual system is not there to take pictures from the outside world but it is a way to support animal orientation in a world that reflects light (Gibson, 1979, p. 63). And the way that light waves are processed not only differs between various kinds of organisms. The human body itself has at least two different ways of interpreting them, according to whether they are perceived by the skin or the eye.

Accordingly, the neuroscientist Damasio (1995, p. 232) concludes 'when you see, you do not just see: you feel you are seeing something with your eyes. Your brain processes signals about your organism's being engaged at a specific place on the body reference map'. In the words of Maturana and Varela (1987), the rays of light are perturbations of the system of the human body which readjusts itself in accordance to these perturbations but they are not discrete signals that enter the system and have a very specific predefined outcome. As part of the process of readjustment to the perturbations an image occurs. This image though, is more a reflection of the internal state of the specific organism than it is a reflection of the outside world.

> ...the environment does not communicate with the observers who inhabit it. Why should the world speak to us? ...The world is specified in the structure of the light that reaches us, but is entirely up to us to perceive it. The secrets of nature are not to be understood by the breaking of its code. (Gibson, 1979, p. 63)

Maturana and Varela (1987, pp. 137) use the analogy of a submarine captain who has never seen the outside world and who just pushes buttons and levers and observes correlations between the data on his instruments and the changes in the states of the buttons and levers. One should not make the mistake though, to conclude that the relationship between environment and what we perceive is totally arbitrary. This is definitely not the case. There is a correlation between the environment and each organism but there are huge variations in how the energies that act upon an organism are represented in its own structure. But generally, what humans call seeing, that is

the visual appearance of the world in the mind, is not simply an act of projecting an image onto the retina which is then forwarded to the brain where it is mulled over. Perception and thinking, just as any kind of interaction with the environment, affects the whole nervous system and body. Neurologically, there is no such thing as an image in the brain nor are there any objective properties of the outside world which are perceived as inputs. Strictly speaking, the only property of the physical world which is reflected in seeing is the fact that there is such a thing as rays of light. But properties such as blue, red, yellow or tree, or the gestalt of a tree are products of human cognition.

3.3 Constraints, Knowledge and Learning in Self-organising Systems

What has been addressed so far is the question of whether seeing can be described as perceiving an image of the world outside. In this sense, the image would be a mirror of objective properties adherent to the physical environment. This is important because the confirmation of such a position would underline the idea that the image provides a more direct access to information than text. Cognitive science though, shows that perceiving is more about making an image rather than perceiving it. This might still seem counterintuitive and the question might arise how organisms function if they do not react on inputs and if they do not receive images containing properties inherent to their environment. The conditions in and outside of the organism can be described as constraints. It is suggested (Maturana & Varela, 1987; Juarrero, 2002) that biological systems move along trajectories set up by those constraints in the environment and the individual's own constitution. The construction of the leg, for example, the amount of freedom the knee and the ankle-joint allow for, are actually constraints that restrict the movements of the leg. Constraints are essential for any kind of body movement. The construction of the leg, in the words of Gibson, is the answer to the *affordance*[52] of a world which provides surfaces that are *stand-on-able*, permitting an upright posture for quadrupeds and bipeds. The world is therefore 'walk-on-able and run-over-able' (Gibson, 1979, p. 127). Thelen and Smith's (1994) research with different babies learning to grab objects shows that different individuals start out with rather different behaviour patterns but through trial-and-error they slowly move towards similar comparable patterns as those are the ones most likely to be successful.

[52] In his book *The Design of Everyday Things* the HCI expert Donald Norman (1998) has utilized this term for the domain of interaction design.

The constraints of the environment, as well as those of the body as a system, serve as attractors that move behaviour along certain trajectories but there is also enough leeway for differences and the interference of other attractors. It is very important in this context to stress again that behaviour, such as walking, is something that cannot be described as a simple reaction of cause and effect (Juarrero, 2002), nor is the movement of the leg an act of total free will. It is actually a movement across a landscape of internal and external attractors which is not deterministic at all but undergoes changes depending on the development of the attractors/repellers (Thelen & Smith, 1994, p. 276). It is thus 'a process of dynamical self-organization that takes place as a result of ongoing interactions between an organism and its environment' (Juarrero, 2002, p. 158).

Maturana and Varela (1987, pp. 172) come to the conclusion that cognitive functions work according to the same principles. The nervous system, they suggest, does not work with representations or 'internalizaion[s] of the environment'. An organism has plasticity and so does the nervous system (ibid, pp. 166). The structure is constantly adapting itself in tune with the environment in a process of structural coupling. The adaptation of the nervous system, like the adaptation of the leg, is a process that is structurally coupled with the environment:

> Each person says what he says or hears what he hears according to his own structural determination; saying does not ensure listening... The phenomenon of communication depends on not what is transmitted, but on what happens to the person who receives it. And this is a very different matter from "transmitting information". (p. 196)

As a consequence, memory, in this respect, is not about recovering specific concrete entities of information that have been stored at an earlier time at a specific place. It is more about establishing the proper semantic patterns, a specific order or negative entropy, as Krieg calls it (2005, p. 39), which refers to a specific event and constructs[53] the memory of it. Learning is not a process of adding new bits of discrete information or of collecting representations but a development of new and higher levels of order and structure. Naturally, this has huge repercussions on the understanding of the function of language and representation. The traditional man-as-a-machine view,

[53] The word re-cognition might be an etymological hint in that it indicates that true understanding happens through an act of repeated cognition.

which assumes that humans communicate with their environment through exchanging information, leads to the conclusion that image and language are somewhat exchangeable in that they are just different formats or channels of communication. The notion of organisms as dynamic and self-organising systems leads to a different conclusion. Language is not just a choice of a communicative tool but it is itself a structure inside of which human identity resides. The next sub-chapter further clarifies this thought.

3.4 Language as Embodied Interaction

The starting point of this discussion was the notion that language is arbitrary while images and icons have at least some resemblance with actual inherent properties of the environment. So far, it has been argued that from a neurological point of view, perception of the world is not to be understood in terms of making images or perceiving any kind of inherent properties at all. In fact, both language and seeing are different processes of structural coupling with the environment. The question to be considered now is how language works at all if words and categories, such as red or tree, are not somehow based on inherent properties of the objects contained in those categories. What is the relation between language and the environment? Lakoff argues that the way humans categorize and thus describe the world has nothing to do with an objective representation of the outside world but is based on an interactive relationship between the speaker and his objects, a structural coupling in the words of Maturana and Varela, as various evidence shows. For once, it is proven that human categorisations differ widely across cultures. Speakers of the Dani language in New Guinea, for example, only have 'two basic color categories: mili (dark-cool, including black, green, and blue) and mola (light-warm, including white, red yellow)'. (Rosch cited in Lakoff, 1987, p. 40). Also, prototype theory[54] shows that human categorisation contains many 'asymmetries among members' of categories. Rosch (cited in Lakoff, 1987 p. 44) demonstrated, for example, that some people would view 'robins and sparrows as the best examples of birds,.. and ostriches, emus and penguins among the worst examples'. This hints at the fact that every-day categorisations are not based on verifiable objective taxonomies but on 'interactional properties, properties characterizable only in terms of the interaction of human beings as part of their environment' (Lakoff,

[54] Prototype theory suggests that humans develop 'scalar goodness-of-example judgments for categories' (Lakoff, 1987, p. 136). This means inside of categories such as birds or trees they develop a range from good to bad examples for each of the categories.

1987, p. 56). While a city dweller might get along with a very basic categorisation of the term tree, a tribesman making his livelihood in the forest, will most likely develop a much more detailed categorisation (ibid, p. 37). Even categories deriving from science, such as in biology, are based on mutual agreements and not on any objectifiable set of theoretical properties. Any kind of strict, objectivist gender classification, be it phenetic[55] or cladistic[56], 'are in conflict with post-Darwinian biology' (ibid, p. 195). The fact of the existence of two taxonomies in parallel, which oppose each other in so many ways, actually demonstrates the inherent problem:

> 'The cladists and pheneticists have different criteria for which properties to take into consideration, and there is no standard, independent of human interests and concerns, that can choose between them and provide a unique answer.' (ibid, p. 186)

Categorisation, as Bruner, Goodnow and Austin (1956, p. 2) point out 'involves an act of invention'. It is a way for humans to 'reduce the complexity of the environment' (ibid, p. 12). Categorisation provides individuals and social groups with a necessary bias that allows them to deal with that environment in a more efficient way (ibid). However, the way humans make sense of the world does simply not correspond to any kind of objectivist model. Referring back to the eye and visual perception, one must admit that strict colour categories, such as green red and blue, do only exist in the human mind and thus, the decision to call a specific range of wavelength *red* is totally arbitrary and does not correspond to any kind of clearly defined set of fixed properties given by nature (Lakoff, 1987, p. 225). The same can be said about 'radial categories' (ibid, pp. 91). The German language, for example, combines women, the sun and watches in the feminine category. Similarly, radial categories of seemingly random relationships exist in every human language.

If objective properties of the world do not exist, what is it that forms linguistic categories? Lakoff (1987, p. 265) as well as Lakoff and Johnson (1980), take what they call an approach of experimental realism. This approach argues that human concepts of the world rely on a preconceptual structure based on embodied experience from

55 Phenetics is 'a system of classification of organisms based on observable similarities and differences irrespective or whether or not the organisms are related' ('phenetics', Chambers 21st Century Dictionary [online]).

56 Cladistics is 'a system of animal and plant classification in which organisms are grouped together on the basis of similarities due to recent origin from a common ancestor' ('cladistics', Chambers 21st Century Dictionary [online]).

which more abstract conceptual structures evolve (Lakoff, 1987, p. 267). The preconceptual level operates on 'kinaesthetic image-schematic structures' (ibid, p. 267) which are nothing more than basic bodily experiences, such as '*containers*, *paths*, *links*, *forces*, *balance* and in various orientations and relations: *up-down*, *back*, *part-whole*, *center-periphery*, etc...' (ibid, p. 267). Lakoff (ibid, p. 271) explains:

> The container schema defines the most basic distinction between in and out. We understand our own bodies as containers—perhaps the most basic things we do are ingest and excrete, take air into our lungs and breathe it out. But our understanding of our own bodies as containers seems small compared with all the daily experiences we understand in container terms.

Lakoff (ibid) continues by quoting from Johnson:

> ... consider, for example, only a few of the many in-out orientations that might occur in the first few minutes of an ordinary day. You wake out of a deep sleep and peer out from beneath the covers into your room. You gradually emerge out of your stupor, pull yourself out from under the covers, climb into your robe, stretch out your limbs, and walk in a daze out of your bedroom and into the bathroom. You look in the mirror and see your face staring out at you... (Johnson, 1987)

And this again brings forth the fact that language is not only an essential part of human interaction with the world but that it in fact constitutes the world as humans know and understand it. There is actually 'no such thing as an abstract language' (Nadin, p. 78) and perception is not a process which reveals an existing objective world. Perception is interaction with the world and so is language (Winograd & Flores, 1986, p. 76). The traditional view has it that language is seen as a system which helps us to 'take in an outside world' (Maturana & Varela, 1987, p. 234). But it is actually man, who brings forth the world through being 'constituted in language' (ibid, pp. 234). Language is based on practical experience in the world and at the same time it feeds back into the way the world is experienced. Language and related symbolic systems are not forms of representation of objective properties via abstract symbols but active processes of producing these properties by naming them and thus, creating awareness Thus they are an expression of embodied social and cultural interaction with the

world. Accordingly a clear juxtaposition of the image as a reflection of the world on one side and the text as an abstraction of the same world cannot be sustained.

3.5 Images in Language: Metaphor

The process by which human language develops reveals a very interesting aspect of the relationship between language and image. Language actually builds on images. Lakoff's (1987) work shows that at the core of language there is the human ability to categorize, to see similarities and differences. The classification of the world into semantic verbal categories enables humans to make sense of the world in a process of active involvement by comparing objects and experiences. But how did human language evolve from grunts and wails into complex categories and classifications in the first place? Lakoff has a clear idea about how, from kinaesthetic experiences, more complex and abstract concepts developed. This is actually a matter of 'metaphorical projection' from the physical domain to abstract domains (ibid, p. 268). Traditionally, the concept of metaphor stems from linguistics. It is a trope, a figure of speech, a description that rather plays down its relevancy. The notion of metaphor as a rhetoric ornament is due to Aristotle (1895, XXI. 4-8), who was the first to develop a theory of metaphor, and has thereby strongly anchored his own substitutional view on metaphor in Western culture: 'Metaphor is the application of an alien name by transference either from genus to species, or from species to genus, or from species to species.' Aristotle basically sets up a hierarchy of genus and species in between which the metaphorical replacements of words takes place, such as 'drew away the life with the blade of bronze' (ibid) where the blade of bronze stands for the sword. To Veale (1995, 1.1.2), this substitutional approach unfairly marginalises metaphor as 'a deviant and aberrant rhetorical effect, serving an ornate and emotive (but ultimately, cognitively empty) role in language comprehension'.

A more recent view on metaphor suggests that it stands for more than just ornamental language and that it actually fulfils a vital role in the development of cognitive structures:

> The Traditional theory ... made metaphor seem to be a verbal matter, a shifting and displacement of words, whereas fundamentally it is a borrowing between and intercourse of thoughts, a transaction between contexts. Thought is metaphoric,

> and proceeds by comparison, and the metaphors of language derive there from. (Richards, 1936, p. 94)

Similar to Richards, Zimmer (2003, p. 15) rejects the notion of metaphor as a simple concept of substitution and underlines its role as a fundamental building block of language and thought. He argues that abstract philosophical thoughts cannot be transferred into language without metaphor: 'Concepts that can only be thought through reason and cannot be expressed through some kind of experience *have* to be expressed metaphorically, in order to be realised properly according to their meaning[57]'. Lakoff (1987), as well as Lakoff and Johnson (1980, p.6), argue in the same line. To them, 'the essence of metaphor is understanding and experiencing one kind of thing in terms of another' (ibid, p.5). Their metaphor theory explains how basic concepts, arisen from kinaesthetic experience in the world, are used to conceptualize more complex phenomena, such as individual psychology, as well as social and cultural interaction. The sentence *I have this thought in my mind* is based on the concept that thought is an object which is placed in a container, the mind. Similarly, a lot of moral or psychological categories are based on spatial relationships, such as to feel *down*, to *hit rock bottom*, to *top* something, to be *on the top* of the world. Often, very concrete terms are used to describe abstract concepts and in that process also transfer their properties to the target domain:

> Try to imagine a culture where arguments are not viewed in terms of war, where no one wins or loses, where there is no sense of attacking or defending, gaining or losing ground. Imagine a culture where an argument is viewed as a dance, the participants are seen as performers, and the goal is to perform in a balanced and aesthetically pleasing way. In such a culture, people would view arguments differently, experience them differently, carry them out differently, and talk about them differently. But we would probably not view them as arguing at all: they would simply be doing something different. (ibid, pp.4)

In line with Zimmer, Lakoff concludes that 'metaphor provides us with a means for comprehending domains of experience that do not have a preconceptual structure of

[57] Translation by author. German original: 'Begriffe, die nur die Vernunft denken und die in keiner Erfahrung rein gegeben sein können, *müssen* metaphorisch ausgedrückt werden, um in ihrem Bedeutungsgehalt angemessen realisiert werden zu *können*.'

their own' (Lakoff, 1987 p. 303). In that sense, the description of the human brain as a machine or a computer is simply a metaphor which helps humans to understand processes which otherwise would be inexplicable.

Metaphorical processes do highlight another important aspect of language: ambiguity. Heim (1999, p. 79) points out that for language to evolve on the basis of metaphor, the images used for the transfer of meaning have to be ambiguous. An image or concept that has exactly one fixed meaning attached to itself cannot shift. Metaphors are actually rather flexible vehicles with which humans move through semantic spaces. This is illustrated, for example, by the way a word such as *gay* has shifted several times over the recent century. While from the thirteenth to the seventeenth century it slowly shifted from 'mirthful, merry' via 'bright-coloured, showy' towards 'dissipated' (gay, 1986, *Oxford Concise Dictionary of English Etymology*), it has in the late twentieth century turned into an accepted description of homosexuality. In recent years it took another shift among young people towards 'lame' or 'rubbish' (Telegraph.co.uk, 2006). While the BBC's Board of Governors thinks that this might well be used in a pejorative sense but, without insulting homosexuals' (ibid)[58], the Urban Dictionary ('gay', <http://www.urban-dictionary.com>) suggests that *gay* is used 'quite preferably among many teenage males in order to buff up their "masculinity"'. Such semantic shifts occur because 'language and cognition are fundamentally social' (Winograd & Flores, 1986, p.176). Language is not foremost a representational device but rather an expression of social commitments (ibid, 76) and as such it is fundamentally ambigu-

[58] This refers to a public disscussion in June 2006 about the usage of the word 'gay' caused by the popular British radio DJ Chris Moyles. Moyles in a life airing in June 2006 used the word gay in derogatory way to describe and ridicule a specific mobile phone ringtone (Telegraph.co.uk, 2006).

ous. Ambiguity thus, is not a deficit but an essential property that helps language to develop[59].

The process of perception and meaning making as it has been described so far presents itself as follows: synaesthetic experience constitutes the basic conceptual understanding of the world. This physical experience of the world manifests itself in conceptual images. These conceptual images are not a reflection of the outside world but an *imagination* in the truest sense of the word. A rise in complexity of semantics is achieved through the metaphorical transfer of one conceptual image to another domain. The conceptual images undergo a change towards a more abstract and symbolic level which generally happens through the death of metaphor. If one takes, for example, the term *time flies*, it is obvious that flying is an activity involving wings or maybe rocket propulsion. As time has neither of both, the verb *to fly* has been attached to a domain that lies 'outside its basic reference class' (Grey, 2000). Over time, however, the connection to the source domain has disappeared and *time flies* has become a term in its own right. Thus, the metaphor is frozen or has died (ibid) and the term has become a part of language in its own right or, in other words, the concrete turns into something symbolic while its imaginative roots are lost. Dead metaphors are an essential part of the above described process of developing ever more complex thought patterns or to employ a metaphor: dead metaphors are the breeding ground for new levels of understanding. And so Lakoff and Johnson (1980, p. 6) conclude that thinking is to a large extent metaphorical.

59 There are concepts and tropes adjoining with and relating to metaphor which shall briefly be outlined and distinguished from metaphor. Condon has actually discussed these issues very stringently and in much more detail than it is possible and reasonable in the context of this dissertation. This explanation mostly follows his argumentation and points out a few of the concepts closest to metaphor. The main tropes that adjoin or intersect with the metaphor are analogy, simile, metonymy and synecdoche. While the metaphor treats the vehicle and the tenor as identical, the simile compares them: the PC is my office vs. the PC is like an office. For the first example the comparison is implicit, for the second one it is explicit (Condon 1999, 2.1.3, p. 4). Analogy contains similar processes than the metaphor but is generally used for the comparison of more complex processes (ibid, 2.13, p. 4). It has to be said though, that the classification in this respect is always open to interpretation and Condon also points out that there is agreement among analysts such as Lodge and Jacobson that metaphor is actually a master trope containing analogy and simile as sub-classes (ibid). Metonymy is another master trope containing synecdoche as a sub-class (ibid). It works by a process of substitution where 'a part or an attribute stands for the whole, or the whole stands for a part' (ibid). E.g.: 'Bill Gates controls 90 percent of the PC market' where Bill Gates stands for Microsoft or for the Windows operating system. What all these tropes have in common is that they allow the transfer of meaning from one term to another. The main difference though between the two master tropes is that 'metaphor is derived from similarity' and 'metonymy and synecdoche from contiguity' (Lodge cited in Condon, 1999, 2.13). While metonymy transfers meaning between terms inside a domain, metaphor allows the transfer from one domain to another. In this respect, the earlier example of the shift of the word *gay* might contain both metonymic and metaphoric aspects.

Educational theory delivers further evidence that this model is a proper metaphor to understand human processes of meaning making. According to Bruner (1966, pp. 10), who built on the work of Piaget (1952), a child gradually goes through the following different approaches towards translating experience into an understanding of the world: first it grasps things, then it identifies and compares visually and finally it develops the ability to reflect on the world in a symbolic and abstract way. Kay (1990, pp. 195), who utilized this theory for developing new approaches towards human-computer interaction, describes the three mentalities as follows: 'enactive: know where you are, manipulate; iconic: recognize, compare, configure, concrete; abstract: tie together long chains of reasoning' and turns it into the short formula '*doing* with *images* makes *symbols*'. Even though all three approaches remain part of the grown up's interactive repertoire, Kay's experience in trying to combine these mentalities in interfaces underpins the suggestion that they actually do not really 'intercommunicate and synergize in more than the most rudimentary fashion. In fact, the mentalities are more likely to interfere with each other as they compete for control' (ibid, p. 195). Not surprisingly, recent research (Sloutsky, Kaminski & Heckler, 2005) indicates that when it comes to learning abstract subjects, such as maths or physics, even young students learn better when the knowledge is 'represented by generic symbols' rather than through 'perceptually rich, concrete representations'. Language, and with it its phonetic annotation, text that is, is a very specific way of interacting with the world. Symbolic representation produces abstract knowledge of the world which goes beyond the instant physical experience.

3.6 Patterns of Meaning

Language is not simply a form of labelling inherent properties of the world. The world does not contain any semantics at all. It is human language which produces these semantics and so human culture rests in language. In order to make sense, any image has to be described with language which is to confirm what Flusser (2003) says about the necessity to criticize images via text as an act of stepping out of the image onto a position where the image can be overlooked. The next question, though, is whether the visual annotation of language necessarily has to be alphabetic. As the Chinese writing system and the hieroglyphs show, this is definitely not the case. However, an extensive symbolic system has, to some extent, to be based on phonetics rather than on an ideographic treatment of signs if it wants to be reasonably practical (see chapter 2.8). In

this respect, the alphabet as a very close approximation to the spoken language comes with certain advantages. Language itself has some characteristics of a dynamic system, in that it contains pattern, attractors, repellers and that it even drives the speaker or reader along certain trajectories.

For this reason, the term *information* as a mathematical concept, has to be introduced. For Weaver (1963, p. 9), information 'is a measure of one's freedom of choice when one selects a message'. This means, for example that one has the choice between specific letters and words to construct a thesis like this. According to Weaver, a version of this thesis, which contains the same words or letters but in a total random combination, contains, nevertheless, the same amount of information. Obviously for the mathematical theory of communication, meaning is not a concern (p. 27)[60]. This theory can, however, analyse the patterns in which information appears and some interesting correlations can be drawn between those patterns and the resulting semantics.

Total freedom of choice means a maximum of information in the framework of a specific communication system. However, total freedom also results in extremely high entropy[61] which in the worst case lets the information occur as nothing more than random white noise. The more information a message contains, the more difficult it is for meaning to appear. Or, in other words:

> in a situation of complete randomness where alternatives are equiprobable you could say anything but in fact do say nothing. Random equiprobable signals are static hiss unable to transmit actual messages. (Juarrero, 2002, p. 133)

This is where the aforementioned concept of dynamic systems comes into play again. It has been shown that humans are organic systems that develop along certain constraints and attractors. The same is the case with language. In order for meaning to appear from messages, specific constraints (ibid) have to be in place so that specific patterns can appear because 'no pattern whatsoever can convey no information'[62] (Juarrero, ibid, p. 135). How do these patterns emerge from language? For example, there is a certain probability to specific combinations of letters or words in English and

[60] The more common usage of the term information is less neutral as it indicates a relationship to meaning and knowledge. E.g.: One of the definitions offered by the Collins English Dictionary (third edition, 1991) is 'knowledge acquired through experience or study'. Outside the discussion of Weaver's argument the notion of information that is used in the context of the thesis is one that combines data with semantics of some kind.

[61] A term from physics and particularly thermodynamics which in this context means a 'lack of pattern or organization' ('entropy', 1991, *Collins English Dictionary*, third edition)

[62] Juarrero does not use the term of information in the sense of meaningful information.

any other language. The probability of the letter 'j' to be 'followed by b, c, d, f, g, j, k, l, q, r, t, v, w, x, or z' in English is zero (Weaver, 1963, p. 11). Similarly, specific word combinations are very much unlikely such as 'Constantinople fishing nasty pink' to use another example of Weaver's (ibid). This is an accumulative effect. The more specific combinations occur, the less likely are others. The word *Constantinople* itself allows for a big range of possible next words. The combination of *Constantinople* and *fishing*, however, reduces the possibility for specific words to come next, both for syntactic and semantic reasons and, in reverse, specific other combinations grow more and more likely. This is exactly why and how predictive text-messaging works. Communication in this sense is not just simply a few signifiers lined up like pearls on a string. It is a combination of very specific signs which together develop a pattern. This pattern, as it grows, carries with it the constraints which are set by the signs which have appeared before. And for that reason, it is simply a mathematical issue that a language based on thousands of pictograms shows less pattern than one based on 26 letters. Juarrero (2002, p. 138) concludes that meaning, therefore, can only appear in a system which via constraints allows for the reduction of entropy and thus includes the ability to develop specific patterns:

> Phonetic, syntactic, and stylistic layers of context-sensitive constraints, added on top of the context-free constraints on the prior probability of individual letters, thus provide a significant advantage over ideograms, pictograms, or hieroglyphs. Without contextual constraints on sounds and scribbles, communication would be limited to a few grunts, shouts, wails, and so forth that would be severely restricted in what and how much they could express. Language's increased capacity to express ideas rests not on newly invented grunts and shouts but on relationships and interconnections established by making interdependent the sounds in a sequence of grunts or shouts, that is, by making the probability of their occurrence context-dependent.

What Juarrero is saying is that for language to develop, that is a symbolic system that conveys meaning, specific patterns have to emerge out of the noise of total information. Or the other way round, abstraction and reduction allow for perceivable patterns. In human language these patterns develop out of constraints which derive from syntax, semantics, phonetics and style. The strength of the phonetic alphabet is that it is able to convey these constraints and its patterns with a low amount of signs but nev-

ertheless, a comparably high accuracy from spoken language to any text medium. Chinese, for example, due to its much bigger pool of symbols, makes it much more difficult to recognize those patterns. So, instead of making reading easy and universal, complex pictographic languages need a comparably high grade of education in order for the reader to compress any information out of the signs which is a contradiction to the idea that image writing could in any way be a gain in a society which is increasingly driven by efficiency.

3.7 Chinese Characters

The thrust for efficiency is not a modern distortion of human communication. Language as a system has always been a means to improve communication and interaction with the world and efficiency is also at the core of hypertext theory. The whole procedure of combining semantics with symbols is a very efficient way of transferring knowledge. When somebody wants to refer to a hammer, he does not have to run into the shed, pick up a hammer and show it to his opposite. He simply says "hammer". However, what is efficient in one context might not be efficient in another situation and efficiency as the final aim of human culture is at least questionable. Writing systems, such as hieroglyphs or Chinese, are not only tools but also an expression of a cultural heritage. A Zen Koan[63] or a Haiku[64] written in Chinese characters[65] can not be equally represented in alphabetic letters. The aesthetic statement would be completely different. There is no point in weighing up cultural value. And despite all complaints about the difficulties of learning Chinese (Moser, 1991), it seems to be a quite efficient tool for hundreds of millions of people, producing millions of highly skilled and educated graduates every year.

While the alphabet might seem comparably simple or even simplistic compared to Chinese Writing or hieroglyphs, there is a certain elegance to it in the way it represents language. That was true for mechanical reproduction in the age of printing and it is still true for the digital age as the comparison with the Chinese writing system shows. Nowadays the main challenge is not so much computation rather than interac-

63 'In Zen Buddhism, a paradox put to a student to stimulate his mind.' ('Koan', 1989, *Oxford English Dicitionary*, second edition, [online])

64 'A form of Japanese verse, developed in the mid-16th century, usually consisting of 17 syllables and originally of jesting character.' ('Haiku', 1989, *Oxford English Dicitionary*, second edition, [online])

65 Haikus are part of Japanese culture but the Japanese writing system is based on Chinese characters.

tion, as the common input device for the computers is still the keyboard which, on a laptop, covers roughly the space of two open hands. The direct keyboard input of traditional Chinese characters is almost impossible (if a keyboard providing 5000 different inputs seems ridiculous, think SMS!). Therefore, Ong (1982, p. 86) was still of the conviction that sooner or later Chinese symbols would be replaced by a phonetic alphabet and hence his rather cynical pun: 'the loss to literature will be enormous, but not so enormous as a Chinese typewriter using over 40,000 characters'. Accordingly, the nineteenth and twentieth century have seen many efforts to reform Chinese writing (Seyboldt & Chiang, 1979, p. 18). In 1949, the Communist government in the name of efficiency and progress, set up an association for writing reform (Yuzhang, 1955, pp. 54). Chairman Mao himself asked for a push towards phoneticization (ibid, p. 57). However, it should not be forgotten that Chinese characters are phonetic representations in the sense that they mostly represent morphemes (DeFrancis, 1984, p. 145). Accordingly phoneticization in this context means a much more radical movement towards a representation of phonemes, the basic units of speech such as consonants and vowels. While Chinese writing has been simplified since, a full shift towards a latinized alphabet is currently not conceivable. Chinese writing still exists of several thousands of signs. In addition to the logistic problems of changing the writing and reading habits of a people of one billion, the main technical issue that the alphabetization of Chinese writing is faced with is that the relationship between the sign and its phonetic reproduction is extremely loose. Many Chinese characters are homophones[66] which makes it very difficult to pin down a specific Romanic spelling (Bohan, 1949, p. 36). As a consequence, China has meanwhile settled rather smoothly into what DeFrancis (cited in Binyong, 1991, p. 26) calls *digraphia*, the 'peaceful co-existence' of two writing systems. Chinese writers use Pinyin, a transliteration system which turns inputs from a Latin keyboard into Chinese characters.

Pinyin writing is a process of continuous predictive text writing. As shown in the example (figure 17), a phonetic spelling of a specific syllable is accompanied by a floating bar which offers the different characters which correspond to the sounds indicated by the Latin spelling. But the writer does not have to choose each character individually. The transliteration system quite fluently predicts whole phrases or sentences. Due to the high accuracy of Pinyin (Binyong, 1991, p.28) and the difficulty of turning Chinese characters into alphabetic letters, Binyong (ibid, p. 29), believes that digraphia is

[66] 'A word having the same sound as another but of a different meaning, origin, or spelling (e.g. pair, pear).' ('homophone', 1996, *The Oxford English Reference Dictionary*, second edition)

most likely the state that Chinese writing will remain in for a long time to come. While the argument can be made that digraphia is a way to maintain a culturally rich writing system, the other side of the coin is that predictive text is always a way of writing constrained by algorithms and databases and thus not open to the same expressive freedom offered by pure phonetic writing. The dilemma of the traditional Chinese characters and similar systems in the face of computerization is summed up by Ming Zhou, a Microsoft researcher based in Beijing: 'What we are chasing is speed. When culture and speed come into conflict, speed wins' (cited from Lee, 2001).

3.8 Iconic Systems

Iconic systems, which are increasingly ubiquitous nowadays, are truly ideographic in that they do resemble an idea rather than a specific word with a specific pronunciation. They are very much part of the modern canon of graphic design and used in print, architecture and interface design. Their usage in these contexts is based on various arguments. It is said that they are rather good in conveying complex narratives such as the functionality of a bin or the possibility to align text (Barker & van Schaik, 2000, p. 159). To a certain extent, icons can be understood across different cultures and languages which avoids the necessity to localise interfaces (Apple, 1992, p. 225; Beardon, 1994). Icons lend themselves to a spatial layout. This helps to visualise the relationships between these objects as well as hierarchies and priorities. Iconic systems are also easily extensible. The iconic language used in the GUI, for example, has constantly evolved since its first designs which suggest inherent flexibility to the iconic system of the GUI.

In the 1920s, Otto Neurath (Crow, 2006, pp. 58) tried to utilize these advantages of iconic language by developing *Isotype*, an international picture language (figure 18). Isotype was an ideological project in line with the Vienna Circle of philosophers which Neurath was part of. They aimed at a symbolism freed from 'historical ballast' thus trying to eradicate the 'misguidance by language' (Medosch, 1997). Neurath (1936, p. 20) in this respect talks of Isotype being exempt from means of 'exchanging views, of giving signs of feeling, orders, etc.' Isotype was not supposed to replace normal languages. It was an attempt towards a strict scientific visual language. Thus, it would be 'an education in clear thought' (ibid, p. 20) as well as a tool for cross-cultural understanding.

While Isotype proved a very successful way of visualizing scientific data, it also shows the limits of iconic language. Any attempt to put natural language on a quantifiable, objective scientific basis simply ignores the fact that language is driven by ambiguities and that human communication rests on social commitments. And in fact, there is evidence that iconic languages are neither objective nor free from ambiguities either. They are as culturally biased as any other language or sign system. King (2000, p. 20), by consulting the 'toilet door problem', explains that the understanding of the male and female icon is down to conventions and not to some kind of objective reality. On one hand the cultural agreement regarding the icon with the skirt is to exclude Scotsmen wearing kilts, cross-dressers and fashion victims like David Beckham. On the other hand the icon only works under the tacit assumption that there is a relationship between the sign, the door and bodily functions. Pictograms or ideograms can 'cross language barriers' (ibid) but again, there is a price to be paid as they are 'vaguer, less rigorously enforced, less consistent and more diffuse' (ibid) than text. King talks about the 'indexical drift' (ibid) and the 'cultural drift' (ibid, p. 21) within ideographic systems, the former denoting a quickly increasing arbitrariness of the sign over time, the latter referring to the change in connotations of the signified itself. So, the reader cannot be sure about the meaning of an image because it offers a lot of ambiguity with regards to its referent in language while at the same time the source domain, where the symbol stems from, has undergone some change in meaning as well. 'Someone must always fill in the missing phonetic values from a knowledge of the language and the context of the communication' (Hobart & Schiffman, 1998, p. 66). Thus, Fuller (2001) concludes that 'Iconic languages [are] swamped in connotation' (Fuller, 2001). Another point, shown via the examples of Chinese writing and the hieroglyphs, is that writing systems cannot be extended endlessly. The more signs the iconic system contains, the more difficult it gets.

Additionally, icons do not fit equally well to represent any kind of concept. The *Macintosh Interface Guidelines* (Apple, 1992, p. 228) recognize that icons do a better job in portraying nouns, such as people, places and things than in explaining verbs or actions such as *save* or *edit*. Eco (cited in Hartmann, 1997) comes to similar conclusions when he states that the strength of images lies in the illustration of 'form or function of a thing' but that it is not adequately suited to 'express action, verbal tenses, adverbs or propositions'. And one should not forget the difficulty of depicting names. No wonder then that Fuller (2001) complains that 'icons look too often like nouns rather than triggers for verbs as functions'.

Roscoe (2000, p.41), in his examination of *The Limits Of Iconic Communication* comes to the conclusion that iconic language as a media technology neither offers 'opportunities for saying anything that could not be said in a one-dimensional language' nor does it have the ability to 'constitute a universal vehicle of communication'.

3.9 The Metaphysics of Hypertext

It should be mentioned again that this thesis does not attempt to play down the significance of the image as an expression of cultural value and meaning. What this thesis wants to do is to demystify the ability of image and icon to substitute alphabetic writing. And demystification is necessary as Winkler (1997) shows. According to him, the aim and aspirations of hypertext theory are truly utopian. He thinks that notions of bringing out intertextuality by overcoming what is seen as the restrictions of the linear, single-author text, are somewhat metaphysically charged and thus a rather dubious affair. Winkler (1997, p.25) summarises the concerns of the underlying poststructuralist theory as follows:

> The principle of linearity seems to have come into conflict with an increasingly complex reality and – both seems questionable to me – the necessities of an increasingly complex thinking; as a final consequence this means that writing, as a modus of depiction, has failed in the face of what it was supposed to depict. [67]

And he goes on to quote from the theorist Bolz (1993, p. 205) who in exactly this sense describes the book as the 'bottleneck of human communication' and its inability to display complexity 'without loss of information'. In reverse, this means that an ideal information structure is one that is able to work without information loss, a 1:1 mapping of the structure it tries to represent. Following this logic, the more texts are made available as a hyperlinked part of the digital docuverse, the better the context and the higher the grade of intertextuality made visible. And meanwhile, efforts to shift print-borne material into this virtual space are in full swing. The *Project Gutenberg* (<http://www.gutenberg.org>) has already made twenty thousand books, of which copyrights have run out in the US, digitally available. In 2004, Google announced to

[67] Translation by author. German original: 'Das Prinzip der Linearität scheint in Konflikt geraten mit einer zunehmend komplexen Realität und – beides erscheint mir sehr fraglich – den Notwendigkeiten eines zunehmend komplexen Denkens; was letztlich bedeutet, daß die Schrift als ein Modus der Abbildung vor dem Abzubildenden versagt.'

scan the books of 'five major research libraries to make their contents searchable' (Kelly, 2006) and Amazon, the biggest online bookseller, has already 'digitized several hundred thousand contemporary books' (ibid).[68]

It is true that the predicted arrival of the universal library containing not only digital-borne texts but also scanned versions of printed books is certainly a very interesting development and it is undisputed that hypertext, in the form of the Internet, opens an immense amount of opportunity in respect to information access. But how can anyone assume that with evermore information flooding the network, there is anything else other than an increase in entropy? How can one assume that having more information does not at the same time, also mean having more choices? Heim (1987, p. 219) predicts that rapid increase of publications of digital documents will lead to some kind of white noise rather than better quality:

> The general atmosphere of computer-mediated communication creates a psychic framework in which more text will become easily available but the text will be probably less intelligent, less carefully formulated, less thoughtful text. Computers may boost productivity, according to this criticism, only to have a greater production of written stupidity, even decreasing the likelihood of finding worthwhile material.

Improved access to information does not solve the problem that this increase of context means an increase in complexity and an increasingly blurred vision. The rapid increase in efficiency might just simply eat itself. What makes the docuverse an even scarier prospect in this respect is the fact that the ideology behind it also bids farewell to history (Winkler, 1997, p. 26) because the docuverse cannot forget. The map not only covers all texts horizontally, it similarly stretches back in time, containing all kinds of versions, slowly resembling Borges' *Library of Babel* (1965, pp. 72). So ironically, the project of a universal library, whilst increasingly turning from a dream into a feasible option, is accompanied by an exponential increase of text production and thus the danger is that this results in a Borgesian nightmare.[69]

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68 It is unrealistic to assume that every text will be freely available for everyone as institutions, companies and individuals will always produce information only intended for a restricted amount of readers.

69 In this context, several texts by the Argentinean writer Borges come into mind: for example, the aforementioned *Library of Babel* which contains all imaginable 410 page books (Borges, 1965, pp. 72) and *The Book of Sand* (Borges, 1979, pp. 87), which describes a book containing all books. A short note called 'Of Exactitude in Science' (Borges, 1973, p. 131) is about a fictional country with such an expertise and perfection in cartography that the whole empire was virtually reproduced on a map of identical scale.

So what cure does hypertext theory have to offer? Does networking itself increase the ability to read, assess and order its own information? How can any source, as interconnected it is and as much as it lays open its intertextuality, take the burden of decision and meaning making from the reader? Winkler (1997) comes to the conclusion that this is exactly what hypermedia theory tries to make believe. On the outside, there is a rather simple 'logic of outperformance' (ibid, p. 26) – everything becomes more complex so the media do the same in order to cope. As flawed as this notion seems, the underlying belief system is even more puzzling. The hidden intention, the dream of hypermedia, is truly utopian. It goes beyond the ambitious enough effort to resemble human thinking structures. According to Winkler (ibid, pp. 28), it tries to mend the friction between the two linguistic domains: the first one existing in the outside world in the form of text, the second one, the system of language itself, residing in the human mind. He thereby refers to the Saussurian notion that meaning or sense does not rest in a text itself but emerges through the act of reading (Culler, 2002, pp. 54) at the moment 'when texts – external speech acts – meet the network of linguistic associations established in the mind.'[70] (Winkler, p. 30) The utopian vision behind hypertext theory, so Winkler (ibid, p. 51), is 'to eliminate the difference between text and language' by embedding the process of making meaning into the text. And while most hypertext theory only implies this final conclusion, Winkler points out that Bolz (1993, p. 222) makes rather daring claims by suggesting that hypertext 'makes explicit, what linear texts leave to the hermeneutic act... The full hermeneutic content of a text is made manifest in the furcating structure of its electronic display.'[71] In terms of literary theory this means that the presentation of a text in its full intertextuality liberates the reader from the act of signification. McLuhan (1964, p. 80) emphasises exactly this when he writes that 'the computer promises by technology a Pentecostal condition of universal understanding and unity'. The artist and theorist Roy Ascott (1999) similarly expresses the hope for transcendental enlightenment which seems to rest in data networks:

> Computer networking, in short, responds to our deep psychological desire for transcendence – to reach the immaterial, the spiritual – the wish to be out of

[70] Translation by author. German original: 'wenn Texte – äußere Sprachereignisse – auf das im Gedächtnis etablierte Netz sprachlicher Assoziationen treffen.'

[71] Translation by author. German original: 'Hypertext macht explizit, was lineare Schriften noch der hermeneutischen Arbeit auflasten [...]. Der gesamte hermeneutische Gehalt eines Texts ist in der Verzweigungsstruktur seiner elektronischen Darstellung manifest.'

body, out of mind, to exceed the limitations of time and space, a kind of bio-technological theology.

The idea that digital networks develop a kind of superhuman intelligence has come a long way and has just recently spread well into the web mainstream, of which notions such as *swarm intelligence* or *hive mind* (Kelly, 1994) give witness, assuming the emergence of a superior intelligence from low-level structures. There is no doubt that the increasing amount of data on the Internet asks for ever more intelligent ways of distribution and discovery of information and particularly the so called Web 2.0, which is discussed in the next chapters, offers a new perspective in this respect and so does Surowiecki's (2004) measured approach in his *Wisdom of Crowds*[72]. The basic concept of swarm intelligence relates to the notion that through cooperation, a swarm of individuals emerges into a superior intelligence which excels the sum of its parts (Wheeler, 1927)[73]. The idea that the interplay of subordinate structures creates new high level structures is a concept also quite familiar to philosophy. Vernadsky (1945) coined the notion of the 'noosphere' describing the sphere of human thought. It is supposed to have emerged from the biosphere with the same consequence as the bio-sphere emerged from the geosphere at an earlier point. Teilhard de Chardin (1959) describes the noosphere as a 'transhuman consciousness', an emergence as a result of human interaction. While it is legitimate for philosophy to make such assumptions, it becomes highly speculative when these ideas of emergence are transferred to net-worked computing which still follows the very basic and deterministic laws of Boolean

[72] Surowiecki (2004) is one of the more realistic proponents of networking intelligence. He argues in favour of the 'wisdom of crowds' quoting Google as a case. Google works on the basis of the PageRank algorithm which is explained in more detail in the next chapter. Surowiecki is far from claiming any kind of metaphysical interference and stays away from terms such as *hive mind* and *swarm intelligence*. He simply argues (ibid) that a mix of individual solutions combined with a collaborative structure which sorts through these solutions can come up with impressive results far beyond what single experts could achieve.

[73] In the early 20th century, the entomologist Wheeler (1927) drew from his observations of ants, termites, wasps and bees that as a result of social interaction, a kind of superorganism emerges from insect hives. Each single hive, so Wheeler (ibid), develops its own gestalt in the form of social and architectural features. It has to be said, though, that Wheeler himself (ibid) strictly opposes the idea of some metaphysical causation of this phenomenon.

logic[74]. And this is exactly what Kelly (1994, p. 28) does by suggesting that from 'a hivish network, many things will emerge that we, as mere neurons in the network, don't expect, don't understand, can't control, or don't even perceive'. From here it is not far to the idea of a network which develops a life of its own.

While Kelly seems to expect the network turning into some kind of uncontrollable alien force, the line of argument deriving from hypertext theory results in a different concept. The problem with language, to sum it up in the words of Borges expert Edwin Williamson (Jose Luis Borges, 2007), is that '[it] is a symbolic system so therefore words themselves cannot comprehend or fully represent reality... Language necessarily falls short of reality'. To accept this fact in the face of an ever-increasing information overload seems not to be an option to many proponents of hypertext theory and other writers. So Winkler (1997, p. 50) concludes that they have developed the metaphysical belief that hypertext will liberate humanity 'from the horror of the fact, that text is fundamentally interpretable and that its hermeneutic content is actually never *manifest*'[75]. It seems that through laying open the intertextuality of all texts, networked computing and hypertext is credited with the miraculous power to turn the nemesis of ever-increasing piles of information into a self-revealing source of wisdom[76].

While it seems unlikely that such wishes will be fulfilled in the near future, the final question in this context remains how this goes together with the idea of alphabetic text being replaced by the image? The aforementioned frustration of both poststructuralism and hypertext theory regarding the abilities of text is a clear sign for a tacit understanding that language, be it spoken or written, will always fail to reach the utopian vision of information which is not only instantly accessible but also instantly understood. The hope is that the image, via its visual richness, might be able to incorpo-

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74 Boolean logic is based on the laws of formal logic (Krieg, 2005, pp. 15):
- The Law of Identity: the same is always identical with itself: A=A
- The Law of contradiction: If something is true, the opposite has to be wrong.
- The Law of the excluded middle: A sentence can either be wrong or right.

Boole developed a grammar around these laws which allows for mathematically manipulating symbols, thus merging human language and mathematics (Hobart & Schiffman, p. 191). In the reverse his system also allows mathematical operations to be instructed to some extent by human language. Thus, it lays the foundation for high-level programming languages. However, in the hands of Boole, language becomes a game where the meaning of words is fully arbitrary, though absolutely consistent. There is no room for ambiguity. All that Boolean logic does is to define whether a statement is true or false (Hillis, 1998, p. 2).

75 Translation by author. German original: 'Das neue Medium verspricht, ein Grauen zu eliminieren. Das Grauen vor der Tatsache, daß Texte grundsätzlieh auslegbar sind und ihr hermeneutischer Gehalt eben nie *manifest*.'

76 Besides the fact that such dreams seem rather unrealistic and those who make such claims should also consider that if text, in whatever form, is able to carry meaning in a way that liberates humans from the act of signification this means, in the reverse, that this text is not dependent on the decisions of humans any longer. The literary machine would become self-sufficient.

rate the degrees of complexity needed to fully represent intertextuality. Stephens (1998, p. 226) talks about the *new video* as a 'philosophical pharmaceutical' and its ability to solve a 'grande philosophic enigma' (ibid, p. 227). The hope that images could solve philosophical enigmas is not only metaphysically charged but it also follows the logic of outperformance. The more information a medium contains, the better it will be able to convey complex thoughts, is the line of reasoning. From what has been shown so far though, it is more likely that stepping back into the image will re-mystify rather than clarify.

3.10 Conclusion

The idea that language and image are simply two different channels of communication with the world is misleading and evidence of a typical objectivist understanding of the world. Humans are dynamic, self organizing systems who do not communicate with the world but are interrelated with it in a process of structural coupling. Thus, seeing is imagination rather than perception. It is the expression of an internal state of a neural network rather than the reflection of objective external realities. Language in this context is a higher form of structural coupling which allows for more complex social relationships among humans and generally adds semantics to the human world. Language is actually a dynamic system in its own right with certain tendencies towards self-organisation. In this respect, the iconic and symbolic represent two very different modes of interaction with the world. While the alphabet is only one possible form of symbolic representation, it is a very elegant one.

Winkler (1997) explains that the discomfort with the alphanumeric texts' ability as a communication medium is actually grounded in a deeper unease about increasing information overload. The huge technological advances in digital computing have massively accelerated the production of any kinds of digital media objects while at the same time the computer refuses to forget. Rather than solving the problem of information overload caused by the printing press, computing made it worse. The only way out now seems via metaphysical intervention, either in the form of a network mysteriously gaining consciousness or otherwise, through the recourse to the intimate and mystic qualities of the image.

The idea that images, pictograms or icons are the better text is simply not true, a fact that will become even more evident in the next chapter. They are a different way of communication but their ability to deal with complexity is limited. Ideographic image

systems have to be very restricted in size to be manageable by the reader. The phonetic letter, syllable or word might lack the immediacy of the image but it is the most efficient way in which spoken language can be properly utilized as a visual system. Hieroglyphs and Chinese characters might offer more eye candy to the reader than alphabetic text but they are by no means an iconic system. They are as much on the symbolic level as the alphabetic text. And when it comes to efficiency, alphabetic writing is probably as efficient as it can get.

At this point it also makes sense to put another kind of imagery, namely virtual worlds such as *SecondLife* or *World of Warcraft*[77], into context. A detailed discussion of this genre is beyond the scope of this thesis but it has to be pointed out clearly that in the light of the evidence of this chapter, they are not at all an argument in favour of the disappearance of text and the advance of the image. They are simply an environment of enactive activity in the Brunerian sense. They do not replace text or hypertext. They serve a totally different purpose. They serve the underlying human need to physically interact with a physical world and, more specifically, the human joy of playing. Ever more sophisticated tools to simulate true physical interaction with the computer such as the Wii[78] are evidence. And while iconic communication tends to be abstract for reasons which have been discussed in detail, virtual worlds become more and more detailed. They do not want to be iconic or symbolic in the sense of Bruner, they want to be enacted.

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77 *World of Warcraft* is a very popular MMORPG. 'MMORPG stands for massively multiplayer online role playing game, a type of MMOG (massively multiplayer online game). An MMORPG is a computer-based RPG (role playing game) which takes place in an online virtual world with hundreds or thousands of other players. In an MMORPG, a player uses a client to connect to a server, usually run by the publisher of the game, which hosts the virtual world and memorizes information about the player.
In an MMORPG, like any RPG, the user controls a character represented by an avatar, which he directs to fight monsters for experience, interact with other characters, acquire items, and so on. MMORPGs have become extremely popular since the wider debut of broadband Internet connections, now with millions of subscribers from hundreds of different countries. Some MMORPGs have as many as a million subscribers.' ('MMORPG', <http://www.wisegeek.com>)

78 The *Wii* is a controller for computer games by the company Nintentdo. '[It] is rectangular and slender, similar to a television remote control. It is wireless and... features a built-in vibration function. The wand-like Wii controller senses three-dimensional motion – up and down, back and forward, side to side – allowing it to be aimed like laser pointer, wielded like a sword, swung like a baseball bat, cast like a fishing rod, and employed in other intuitive control schemes.' ('Wii', <http://www.answers.com>)

4.0 THE INTERFACE: AFTER THE GUI

4.1 Introduction

Computers have created an unprecedented freedom with regards to producing new means of communication. The possibilities for interfacing with computers are almost unlimited but this overabundance is not without challenges. Human body and mind are the result of embodied interaction and exchange with the physical world but how does one interact with the unknown? What are the criteria for building interactions with a medium that is based on no specific inherent affordances? And what are the consequences for the content of the communication? Because, whatever the reader reads from, affects what he reads. The interface becomes part of the content, part of the text in whatever form. The procedures involved in making the text available, such as turning on a computer, finding, opening and browsing documents, are obviously not as banal as the opening of a book or flicking through several papers, and so the relationship between content and interface is reasonably more complicated. This chapter investigates the most common approaches towards interface design and it particularly looks at the nature of the GUI which has been the dominating interface paradigm for almost two decades. It investigates whether the dominance of the GUI really is proof for an increasingly pictorial approach towards digital writing. But it also tries to answer the question, whether the GUI is here to stay. This is because currently the GUI deals with the biggest challenge which it had yet to face, the shift from personal computing towards networked computing, namely the Web.

4.2 Machines Without a Face

Interfaces are as old as media themselves. Writing and images are interfaces in their own rights and obviously the book, with its turnable pages, provides a specific interface as does the painting in the gallery or the poster advert in the city. All kinds of artefacts provide an interface for humans to interact with and very often the design is a direct result of the properties of the objects involved in the interaction. The basic design of a chair, for example, relates to specific physical and physiological affordances or constraints which stem from the need to facilitate the sitting of specifically shaped and sized organisms in a world which has certain gravitation and floors of a specific consistence. If ever a computer interface was related to the affordance of its construc-

tion, it was in the early days. The ENIAC, one of the first American computers, built in 1946, was programmed by plugging in and out physical connections for each new program. 'The interface was inside the computer; in effect, it was the computer' (Wurster, 202, p. 25). As long as each machine filled a whole room, was extremely expensive and only a few available worldwide anyway, the complexity which came with the interface was negligible as highly trained experts would have to operate them anyway. But it was not very long before the computer began to thrive on one of its main characteristics, the strict separation between the interface and the underlying functionality. Manovich (ibid, 2000, p. 47), in his definition of new media objects, notes that one of their main properties is the division between the computer layer and the cultural layer with the former being the code itself and the latter the way it is displayed on the screen or in any other form which supports computer output. This manifests in what he (2000, p. 36) calls *variability*, the ability to 'exist in different, potentially infinite versions'. Hillis (1998, p.39) notes, 'the magic of a computer lies in its ability to become almost anything you can imagine, as long as you can explain exactly what that is'. A computer just has to compute. And, while the architecture of its chips is somewhat defined by its materials and the necessities for speed and efficiency, 'the user interface can be designed to mimic the behaviour of almost any device. The possibilities for representing information and actions are virtually limitless' (Ellis, 1993) which implies that computers are actually representational machines.

But while the interface can be anything, it has to become something in order to fulfil a specific purpose. One of the main aims of any interface to any medium is a certain amount of transparency in the sense that the user sees through the interface onto the information (Heim, 1999, p. 48; Bolter & Grusin, 2000, pp. 32). If an interface is too complicated, the view on the content is blocked, as the user is too busy finding out how to handle the machine. Kay (1990) refers to the same issue when he reinterprets McLuhan's (1964, pp. 7) slogan that 'the medium is the message' in an interesting way. He comes to the conclusion that 'message receipt is really message recovery; anyone who wishes to receive a message embedded in a medium must first have internalized the medium so it can be "subtracted" out to leave the message behind.' As long as the reader experiences the interface as opaque, it remains an obstacle, an external object. Once it is transparent it can really turn into an 'extension of man' (McLuhan, 1964). This is what some designers might refer to as an intuitive interface. Raskin (2000, p. 150), though, rightly emphasises that there is no such thing as an intuitive interface in

the sense that any understanding of a supposed interaction has to be based on earlier experience with similar concepts.

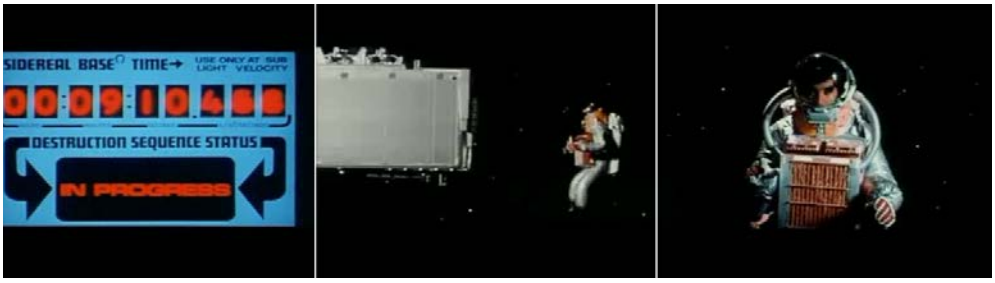
4.3 Dialog Driven Interfaces

For the first computers alphanumeric text or image display were not an option. The Z3, completed by Zuse in 1941, was the 'first fully-functional, program-controlled, and freely programmable computer' (Wurster, 2002, p. 19) in the world and Zuse was mainly interested in finding a way to deal with repetitive calculations. In his patent application he describes his machine as a 'storage devise' for 'any desired data' (ibid, p.19). As a logical consequence of the fixation on calculation and storage of data, the means of displaying were rather crude:

> The Z3 read its instructions – the program – from holes punched into 35-mm film, while the data were entered on a numeric keypad. The results could then be read out on a row of tiny lamps. (ibid, p. 19)

Interface methods evolved slowly but steadily. The first mainframe computers in the early 1950s were fed their operating instructions via punch cards and paper tape. And while in the early days a finished programme had to be fed to the computer, in the mid 1950s, the invention of magnetic disc systems allowed for direct intervention into the computer's processing and thus prepared the way for an operating console (ibid, p. 48). Still though, the interface had not fully moved away from the notions of the industrial age where buttons were pushed and levers pulled in order to keep goods on its irreversible one-way street down the assembly line with man trying to adapt to the rhythm of the machine.[79]

[79] A personal report from the early days of computing: 'It was like running up a power station. The false floor of the computer centre shook, fans hummed and churned up the air, magnetic disks sang out a top C. I pressed a button marked IPL: Initial Program Load. The operating system lifted off, myriads of little lights danced, and the console typewriter rattled out a cryptic code. Hastily I piled the punched cards onto the rails of the hopper, and they disappeared with a ratter-tatter into the bowels of the blue metal case, to be spewed out shortly afterwards into the stacker. I followed them with other decks of cards, red, green, and blue: Job-control, language, program, data. When the line printer began hammering out a program listing and any error messages on the zebra-striped fan-fold paper, with its characteristic vibrato screech, I sank back exhausted into a chair. An hour of computer time on the IBM/360, now that was real computing!' (Zopfi cited in Wurster, 2002, p. 63)



ıre 19: A truly conversational interface: in John Carpenter's 1974 debut feature *Dark Star,* Lt. Doolittle is involved in osophical discussions with a bomb attached to the outside of the space ship, trying to convince it that it would be better to explode (see footnote 80). While only a vision in the 1970s, call centers have meanwhile established verbal communi-on with machines as an everyday commodity. However, this form of spoken interaction is mainly reduced to media ch are based on oral communication in the first place, such as phonelines. Visual media are most likely to be controlled :eyboard, mouse or other tangible interfaces.
age source: screenshots from a clip on youTube, <http://youtube.com/watch?v=qjGRySVyTDk>)

Around the same time the monitor with the command line interface (CLI) appeared. This was the decisive moment when the interactions between the operator and the computer evolved into a real-time dialog. The operator would type in text and the computer would directly respond. While this form of interaction was still very complex and asks for a lot of expertise, the idea of human computer interaction modelled on human-to-human conversation has ever since remained part of the interface vocabulary. Related to such visions is the idea of artificial intelligence, the notion that computers can match or even overreach human thinking and intelligence. One of the first widely recognized attempts in that respect was Weizenbaum's *Eliza* from 1966 (Rheingold, 2000, pp. 163). Eliza is a software which enters into conversation with a user via a text-based interface. The actual conversation, though, is an illusion. Eliza is a parody of a psychoanalytical technique which mainly takes the answers of the patient and turns them into a question. One of the most famous visions of human computer interaction based on conversation is the computer HAL from Kubrick's movie *2001: A Space Odyssey* (1968) based on the homonymous novel by Arthur C. Clarke (1968). A few years later, the conversations between Bowman and HAL have been satirised in Carpenter's *Dark Star* (1974), where a crew member involves an intelligent bomb in a philosophical discussion[80] (figure 19). Conversational interfaces are now part of everyday experience even though in a less obvious manner than described in science fiction.

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80 The following excerpt from Lt. Doolittle's conversation with the bomb is a quite amusing epistemological discourse between man and machine which touches on some of the issues mentioned in chapter three with regards to questions of perception.
Doolittle: Hello Bomb, are you with me?
Bomb: of course.
Doolittle: Are you willing to entertain a few concepts?
Bomb: I'm always receptive to suggestions.
Doolittle: Fine, think about this then. How do you know you exist?
Bomb: Well, of course I exist.
Doolittle: But how do you know you exist?
Bomb: It is intuitively obvious.
Doolittle: Intuition is no proof. What concrete evidence do you have that you exist?
Bomb: Hm..., well..., I think, therefore, I am.
Doolittle: That's good, that's very good. But how do you know that anything else exists?
Bomb: My sensory apparatus reveals it to me.
Doolittle: Ah..., right.
Bomb: This is fun.
Doolittle: Now listen, listen. Here is the big question. How do you know that the evidence that your sensory apparatus reveals to you is correct?... What I'm getting at is this: the only experience that is directly available to you is your sensory data and this sensory data is merely a stream of electrical impulses that stimulates your computing centre.
Bomb: In other words, all that I really know about the outside world is relayed to me through my electrical connections.
Doolittle: Exactly!
(footnote continues)

Microsoft Office's jolly *it-looks-like-you're-writing-a-letter*[81] popup (figure 20) is an example of a conversational approach towards interfacing. But also, the whole idea of filling in online forms when ordering goods or services over the Internet is organised around the idea of conversation: questions are asked by the interface and answered by the user.

How are conversational interfaces positioned in the context of the debate of this thesis? First of all, most conversational interfaces are either based on language or on written text due to the fact that conversation asks for a certain precision. A conversation which includes the handover of one's credit card details in exchange for an online purchase, for example, needs to avoid ambiguity. Thus, everything has to be spoken out and nothing can be left to the imagination. The other question would be whether, over time, such conversations could turn into spoken interchanges with the computer. Verbal computer-based communication is also nothing unusual. Nowadays, nearly every personal computer comes TTS (text-to-speech) enabled and the ability of computers to read out text has become a feature indispensable for many visually-impaired people. For normal-sighted people though, the two-dimensional layout of language in the form of alphabetic text is still by far the more common option. The most likely speech-to-speech interaction between humans and computers happens through kiosk systems and call centres. The way of conversing with such systems though, is mainly based on guided tours through various branching paths of a hierarchy tree due to the fact that computers are still an applied expression of the laws of formal logic (Krieg, 2005). There is no room for ambiguity[82]. Any statement has to be clearly defined as true or false.

It is worth looking for a moment at the hypothetical case that PCs would be able to brake out of formal logic and develop human-like conversational skills. On the face of it, it could be a conceivable option that such an approach would supersede the necessity to represent information as objects in a physical space as one would be able to communicate with computers just like with human beings. To open a document one

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Bomb: Why..., that would mean that... I really don't know what the outside universe is like at all, for certain?
Doolittle: That's it, that's it!
Bomb: Intriguing, I wish I had more time to discuss this matter. (Dark Star, 1974)

81 This is also the title of an article by Matthew Fuller (2001) in which he dissects the 'absurd complexity' (Raskin, p. 145) of the interface of Microsoft Word (pre Word 2007).

82 One of the ways to overcome this issue is so called fuzzy logic which establishes degrees of truth between the polarities of true and false. This makes perfect sense for domains which can be measured, such as temperature, where in between cold and hot there are various degrees of warmth. However the attempt to extend it to other semantic areas should be approached with extreme caution as Lakoff (1987, pp. 141) explains.

could, for example, say 'open the thesis please'. The reality is that such an approach would most likely be rather cumbersome. The computer might answer 'which version?' 'The one that I worked on yesterday!' 'You worked on two different versions of the document, so which one?' The discussion could go on forever just like in the aforementioned movie Dark Star where Lt. Doolittle tries to convince a bomb that it should not explode, at least not as long as it is attached to the space ship (see footnote 73). Most interactions with computers, like writing a document or defusing a bomb for that matter, relate to very efficient interfaces for command and control rather than social interactions and the input of discrete symbols is a very effective tool for such purposes.

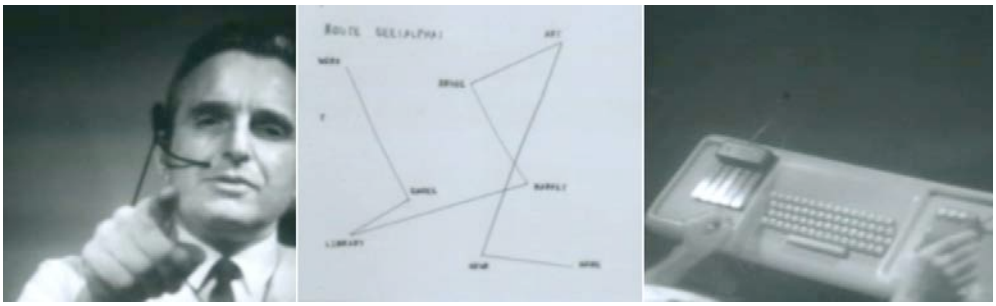
4.4 Manipulating Objects on the Desktop

Douglas Engelbart (1962) was one of the first to fully realize the potential of spatial layout for digital data. In 1962 he presented his framework to 'augment human intellect' which incorporated the idea of the digital computer as a personal working tool. Engelbart, corresponding to the earlier ideas of Bush (1945), envisioned the establishment of the computer as a supportive device for all knowledge workers across the science community. Such an extension of the target group, beyond the domain of computer experts, moved the question of the interface to centre stage. But Engelbart did not just provide the conceptual framework for personal computing. In his famous demo of the NLS (oNLineSystem) at Menlo Park in 1968 (figure 21) he presented the mouse, windows and menus for navigation (The Mouse Site, 1968; Tuck, 2001), all of which have become cornerstones of the predominant WIMP interface, which consists of *W*indows, *I*cons, *M*enu and *P*ointer[83].

Part of Engelbart's vision was the idea of direct object manipulation via mouse on the screen which is in stark contrast to the CLI[84]. The big difference is that the earlier concept of the command line interface engages the operator into a dialog based wholly

[83] There is some disagreement about the exact expansion of the acronym WIMP. i.e.: for Green and Jacob (1991) M stands for 'mice' while Edwards (1988) takes it as a substitute for 'menu'. As mouse or mice can be seen as subsets of pointing devices which are already covered by the P for 'pointer', this thesis suggests to include the 'menu' instead.

[84] Arguably the *SpaceWar!* videogame by Russel from 1961 (Graetz, 1981) as well as Sutherland's air traffic control software *Sketchpad* from 1963 (Sutherland, 1963) already include functioning concepts of screen-based direct object manipulation. However, besides the fact that he was working on the practical realisation of his concepts since the early 1960ies, Engelbart was the first one to utilize the notion of object manipulation in a wider conceptual framework of knowledge working practice which makes him a paramount figure in the development of the PC.

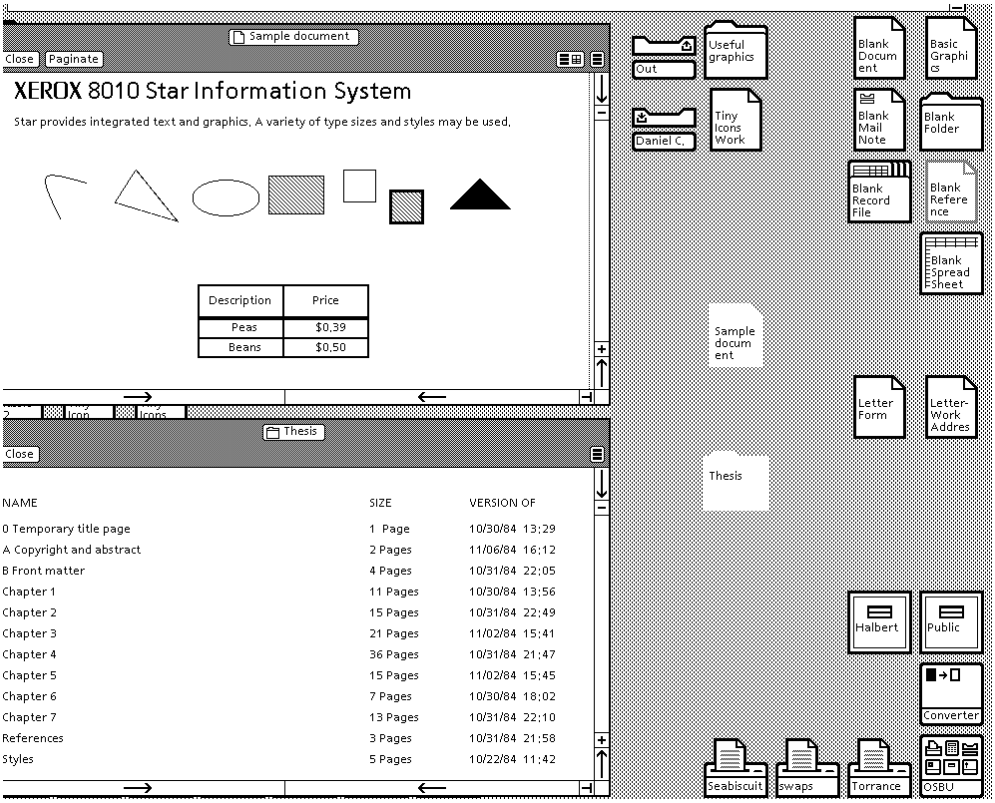


ıre 21: Screenshots from Dough Engelbart's famous demo at Stanford Research Institute in Menlo Park in December 8. He (left) demonstrates the NLS, the first computer interface to feature mouse, pointer and windows. The screenshot he middle shows the revolutionary concept of spatial layout of data where up to then the command line was the norm. tial layout though, asks for a more direct interaction with the screen than the keyboard provides for. Thus, on the right › of the keyboard (right) there is the mouse which allows pointing at and the selection of objects on the screen.
age source: screenshots from a movie clip on the *MouseSite* <http://sloan.stanford.edu/MouseSite/1968Demo.html>)

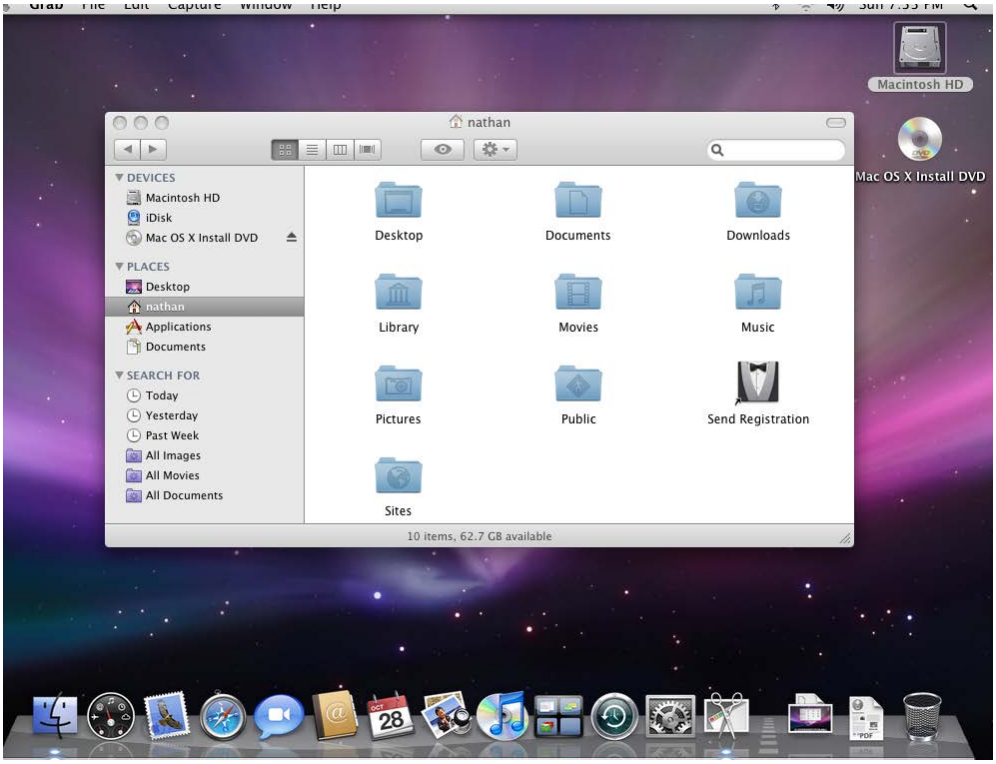
on the idea of language and text: one works his way along the screen from the top left to the bottom right according to the western tradition of writing. Direct manipulation, in contrast, understands any text as an object on a 2-dimensional surface which can be pointed at or moved around. This suddenly brings to the foreground the position of texts or words to each other not only grammatically but on a spatial level. Thus, hierarchies can be expressed, reading directions can be influenced or connotations can be changed through the spatial relation between text objects.

The objects that Engelbart was working on in his presentation were of a rather abstract nature: knowledge workers were expected to manipulate texts, lists, hierarchies and charts. The 'I' of the WIMP, the icon that is, was still missing. It took the Xerox PARC labs until 1974 to come up with the *Alto* which was the first workable computer that included Engelbart's ideas, plus, the first fully working graphical user interface (GUI) (Tuck, 2001)[85]. The GUI takes the idea of object manipulation literally by mimicking the real world: textually expressed ideas and concepts are turned into objects via pictorial icons such as folders, bins and buttons, and the third dimension is simulated with shades and overlays (figure 22). The screen itself takes on specific properties of the office environment, which is also called the desktop metaphor. This is a remarkable shift. While a few years ago the computer was mainly used as a calculator, those calculations were now used to simulate and describe a whole new world. Since the launch of the GUI for the consumer market in 1984 through the *Apple Macintosh*, this interface has become the norm in personal computing. There are estimates that in 2000 well over 90% of people used a GUI based on the desktop metaphor (Tuck, 2001).

[85] Cramer (2005) makes an interesting remark about ancient mnemonic systems, such as the earlier described memory palace and its relation to graphic user interfaces: the 'memory palaces' and 'memory theaters' developed later in the Renaissance bear a striking resemblance to GUI (graphical user interface) desktops and their representation of files through icons arranged in a space.



ıre 22: A screenshot from the desktop of the 1981 *Xerox Star 8010*. The Star work station came with the prototype of a : generation graphic user interface for office applications. It heavily inspired the designers of the first commercially :essful GUI which was rolled out with the Apple Macinthosh in 1984. In these early years desktop icons were black and te and had a strong outline, and maybe a few more lines to describe the surface or to represent a very crude notion of the d dimension. This degree of abstraction was down to technical necessities as in the 1970s and early 1980s computers nly used 1-bit monochrome monitors. (Image source: <http://toastytech.com/guis/starbitmap2.gif>)



ıre 23: A screenshot from *Apple OSX Leopard*, the current state of the art operating system for the Apple computer. The ɔit color standard (16 million colours) combined with increased definition of modern screens allows for an increasingly histicated GUI. The designers of Apple have not only increased the physical presence of the objects on the screen, they e also introduced central perspective and reflection in order to give the impression of three-dimensional space. Thus the ıs are not stitched onto a surface any longer but seem to stand or hover over a little stage which expands from the bot- of the screen into what seems like an open space. The current GUI appears to be the ultimate expression of the iconic ı. (Image source: <http://www.guidebookgallery.org/>)

4.5 Mimicking the Real World – Metaphor in Computing

Engelbart's vision had opened the door for a huge shift of interface paradigm. The GUI has gone a long way from its rather crude beginnings on the basis of 1 bit monochrome monitors (figure 22). Meanwhile, *Apple OSX* (figure 23) or *Windows XP* and *Windows Vista* display highly detailed icons using perspective, shadings and defined surfaces in order to close down the visual gap between real-world objects and its screen counterparts. The computer screen has turned from a text display into a fantasy landscape with a very idiosyncratic mix of graphics, photos and alphabetic text. Is not the GUI actually the ultimate proof that interfacing with computers encourages a strong iconic turn? What it certainly has proved is that iconic and enactive forms of interaction can be used to encourage inexperienced users. The designers of the Xerox-Star, the 1981 successor of the Alto and first 'true GUI-driven' (Tuck 2001) PC describe the motivation behind the invention of the desktop metaphor as follows:

> We decided to create electronic counterparts to the physical objects in an office: paper, folders, file cabinets, mail boxes, and so on – an electronic metaphor for the office. We hoped this would make the electronic "world" seem more familiar, less alien, and require less training. (Our initial experiences with users have confirmed this.) (Smith et al, 1982, p.252)

In other words, the GUI was a trick to make users familiar with the unfamiliar and it worked. However alluring it is to simply judge the GUI on its commercial success, the matter is more complicated than that and the GUI is not as unproblematic as it seems. In the following, the usage of metaphor in computing and particularly its iconic expression will be scrutinized more closely. This is necessary in order to understand how the landscape has changed since the early days of personal computing and how the current interface paradigm has come under increasing pressure through these changes.

The conceptual basis of the GUI is a metaphor. Similar to spoken language where it supports the understanding of yet abstract concepts, the concept of metaphor is used in interface design in order to help inexperienced users cope with an otherwise abstract interface. Neale and Caroll (1997, pp. 447) define metaphor in the context of interface design as follows:

> In contemporary research, metaphors are conceived of as cross-domain mappings. That is, metaphors allow the transference or mapping of knowledge from a source domain (familiar area of knowledge) to a target domain (unfamiliar area or situation), enabling humans to use specific prior knowledge and experience for understanding and behaving in situations that are novel or unfamiliar.

A few other terms and definitions used in the following have been coined by Richards (1936, pp. 96) who delivered a terminology of the constituting elements of metaphor. The *tenor* describes the concept which the metaphor is dealing with. In the case of the GUI, this might be the idea of manipulating and archiving information. The *vehicle*, in this case the traditional office environment, stands for the concept that lends its properties to the *tenor*. The *ground* describes the features both domains have in common, e.g.: the desk, the documents and the folders. The *tension* describes the effort which has to be made in order to correlate *tenor* and *vehicle* or the dissimilarities between the two domains. Regarding the GUI, this would refer to the fact that, for example, the objects have to be picked up with the cursor rather than with the hand, the fact that documents cannot be stacked upon each other or that folders exist inside of other folders.

The usage of metaphor in human computer interaction is a much more pervasive phenomenon than just the conscious reference to the office environment. The command-line interface, for example, with its strong degree of abstraction relates to the western tradition of writing on a piece of paper from the upper left to the lower right corner and thus, carries a metaphorical reference as well. Neale and Carroll (1997, p. 451) assume that OOD (object-oriented design) techniques for software are also based on metaphor. Nardi and Zarmer (1990, p. 16) fiercely object to such a view with the argument that object-oriented programming describes a system 'whose complex internal logic grew out of needs peculiar to the programming problems it attempts to solve, and which must be understood completely in its own terms'. But even if the practice of programming would constitute such a hermetic, metaphor-free domain, which is doubtful at least, the question remains how humans can grasp such unknown abstract territories? Computer programs are basically a sequential organised procedure of operations. Whereas in the early days of programming, there was a strong emphasis on the hierarchical process, even though interrupted by loops and leaps, meanwhile the view has shifted. In an object oriented programming environment the talk is about *relationships* between *objects* which *communicate* with each other through *functions*

and *methods* according to specific properties. 'These are unarguably metaphors, introduced to assist the programmer, and have no existence in the low level machine code which is generated' (Condon, 1999, 2.1.2). Looking back at the third chapter, which explains how the whole human worldview is based on an increasingly abstract succession of metaphorical shifts, it does not surprise that there are suggestions (Krieg, 2005, pp. 55) that the whole concept of logic and thus the internal principle of modern computers is based on metaphors as well[86].

The way interface metaphors are structured are various as the following overview, based on Neale and Caroll (1997, pp. 444), shows. The *dialog* was mentioned as an interface metaphor. The *object* which can be manipulated and worked upon is not a notion restricted to programming but can be found on the desktop which is filled with objects such as bins and folders. While objects are related to notions of space, there are also activity-based metaphors, such as *travel*, which structure the interaction around movement. An example would be websites which can be accessed through *surfing* the *information highway*. The desktop and its related metaphors are what Väänänen and Schmidt (1994) would classify as *real-world* metaphor, as it refers to elements from the real world.

In 1995, Microsoft actually tried to replace the office with an even more realistic real-world metaphor which was called Bob (figure 24). Targeted at beginners and technophobes, this was a GUI for Windows where the whole interaction with the applications went through the metaphor of a cartoon-like house: the living room is the equivalent of the current desktop and many items in the room have specific functions attached. Clicking on sheets of paper laying around on a virtual table, for example, starts the word-processing software. A clock on the wall shows the time and doors mark the way to rooms serving purposes such as meetings or doing research. A dog and other little cartoon creatures guide the user along the different processes and functionalities. Bob was a total failure. The only surviving elements are, at least up to Windows XP, the infamous paper-clip of MS Word and the dog in the Explorer search function[87].

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86 Krieg (2005, pp. 55) argues, that abductive and inductive reasoning are nothing more than conclusions by analogy.

87 The author has repeatedly conducted an experiment with students with regards to real-world metaphors: they were asked to come up with design concepts for an email or layout application based on metaphors such as *a day on the beach*, *relationship* or *religion*. It was interesting to see that students were able to translate such far-fetched analogies into a coherent concept for interfacing with software. Using, for example, the concept of religion as a metaphor, students would ask the user to virtually go into a *confessionary* in order to write an email. To send the same mail, he would press the *Amen* button and to delete it, he would drag it onto the *cemetery*.

ıre 24: Microsoft's disastrous shot at real-world metaphor: the Bob interface from 1995. As difficult as it is to challenge a ımon and widespread interface paradigm, the failure of this attempt was at least as much related to the implementation design of the chosen house metaphor. The vehicle of this interface metaphor, the home, gets in the way of the tenor, the ıal tasks the user has to deal with, such as writing letters or emails. The metaphor contains by far too much information. age source: <http://www.guidebookgallery.org>)

The problem with Bob is that metaphor, neither in interface design nor in language, is about exact replication of the source domain from where the metaphor derives from. Johnson (1997, p. 59) highlights that it is actually the tension between the originating source domain and the target domain in which it is utilised that makes a metaphor powerful. 'Metaphors based on complete identity are not metaphors at all.' Successful interface metaphor is about utilizing some obvious properties of the physical world where it makes sense while leaving out others. In an interface metaphor, the *tension* – to use the linguistic terminology of metaphor – is as important as the common *ground*. The digital domain has its own properties which cannot be matched by the analogue world. It is the transcending qualities outgrowing the initial properties of the source domain which come in effect when we look at the notion of magic in the context of interface design (Smith, 1986). Magic describes functionalities and properties which are only possible in digital media but not in the real world, such as transparent layers, drop-down menus, scrolling and the likes. 'Should we transfer the paper metaphor so perfectly that the screen as 'paper to be marked on' is as hard as paper to erase and change?' asks Alan Kay (1990, p. 199). 'Clearly not. If it is to be like magical paper, then it is the magical part that is all important and that must be most strongly attended to in the user interface design' (ibid). The Macintosh Human Interface Guidelines (Apple, 1992, p. 5) point out that the designer has to 'strike a balance between the metaphor's suggested use and the ability of the computer to support and extend the metaphor'. Bob, on the other hand, was a simulation of the real world rather than a fusion of the best of both worlds: real-world concepts combined with computer magic. Bob was trying to directly transfer an image of the real world onto the computer regardless of whether it would serve the purpose or not. (Johnson, 1997)

4.6 Is Metaphor the Right Metaphor?

Bob tells a few things about the feasibility of image-based human computer interaction. It was shown earlier, that the image has a tendency to stand in for the thing that it represents, to replace it. In that sense, a real world approach towards interfacing can be extremely successful when the image is allowed to do what it is best at, defining a world in its own rights. Second Life or World of Warcraft, for example, are domains where the imaginary world becomes reality, even though a virtual one. Both are about interacting with virtual characters in virtual spaces. It is about avatars chatting up avatars or fighting each other. It is not, in the case of World of Warcraft, about using the

avatar as a placeholder to kill the real person behind some other avatar. People become involved in a game which is very much enactive and closely related to how they would interact with the real world, plus some added on magic. Those games are the real thing and not a metaphor. The problem with Bob is that rather than becoming a consistent virtual world it is used as a placeholder for something else. It is used as a front for some very abstract interactions of a symbolic nature – handling documents – and thus, the enactive experience of being in a virtual world is constantly interrupted.

In that sense, the GUI does a slightly better job because it does not pretend to be a virtual world. It only attaches some visual hints to rather abstract objects, which help the user to attach certain properties of interaction to them. Not surprisingly for Bolter (2001), the GUI is exactly one of those focal points where the transition from phonetic writing to pictorial writing takes place:

> The graphical user interface itself constitutes … a text. Because pictures and verbal text in the interface belong to the same space, pictures may cross over and become textual symbols. … If phonetic writing pulls the writer and reader toward the pure linear space of spoken language, pictures, diagrams, and graphs pull them back to a pictorial space that is at least two-dimensional and whose visual meaning is not strictly codified. Different writing technologies have mediated this tension in different ways. (p. 64)

The desktop or the menu bars of Microsoft Word resemble an agglomeration of symbols which one could definitely call a text. The questions here are actually what the nature of this text is and whether it works. First of all, it has to be mentioned that there is a big difference between the printed symbol of a folder and the folder symbol on the desktop. The difference lies in the fact that the folder symbol on the desktop has some inherent meaning attached to it which cannot be dissociated. Whatever the user reads into the visual form of the icon, the exact and unambiguous instruction attached to the icon remains and will not change. Whether the user sees the icon as an archival file, a brown blob or a handbag, does not change the fact that clicking it results in a clearly defined reaction of the system. In that sense, the equation of the GUI with a normal symbolic text becomes at least questionable.

The fact that the underlying set of instructions remains constant, while the visual interface is prone to the typical semantic shifts of any symbolic system, is actually a cause for trouble and the design approach of visual metaphors has over time drawn a

lot of criticism. Alan Kay (1990, p. 199) complains that 'metaphor is a poor metaphor for what needs to be done' and Ted Nelson (1990, p. 237) in his usually explicit way, expresses his displeasure that the '"metaphor" business has gone too far' and calls the desktop metaphor 'that opening screen jumble' (ibid). Nardi and Zarmer (1990), who are among the most articulate critics, argue that the domains the user is dealing with on the computer develop their own semantics and therefore any attempt to explain them with the words of another domain is just a poor substitute and will turn into a restriction.

Metaphor mismatches are probably the most obvious issue which lead to this kind of criticism, with one of the most notorious examples being the 1980s Macintosh bin problem. In order to eject a disc, the user would have had to drag its symbol onto the bin, which is the same action he would use to delete a document (Nelson, 1990, p. 237). Not surprisingly some users feared for their data stored on the disc and as Rohrer (1995) describes, preferred to turn off the computer in order to get their disc ejected automatically. The reason for mismatches lies in the nature of interface metaphors itself. Not all of the properties of the vehicle are present in the icon, for the bin is a much reduced abstraction of its origin, two-dimensional, much smaller in size, and it does not smell. In the same way that properties are left away, the metaphor is often extended with qualities inherent to the digital domain, the earlier mentioned 'magic'. E.g. in Windows XP, once the *empty bin* instruction has been chosen, a pop-up window shows the bin magically throwing out one item after the other. Thus the expression of a metaphor on the screen is always differing from its original. The actual properties of the expressed metaphor and its relationship to its source domain have to be explored and learned through interaction (Duit, 1991). This leaves room for interpretation and with it comes the chance of misinterpretation.

Another problem is the scalability of visual metaphor (Hollan & Bedersen?). The closer an interface metaphor visually operates to its source domain visually, like for example Bob, the more detailed are the expectations of how the metaphorical representations are supposed to behave. This can restrict the usefulness of the metaphor as it might raise false expectations. Visual detail and explicitness links a real world metaphor to a certain frame of reference. The more rigid this frame is, the less likely it will be able to adapt to new possibilities and increasing complexity in the domain it represents. The metaphor simply does not scale (Hollan & Bedersen, 1997, p.46). The fol-

lowing comment by Alan Kay (1990, p. 200) describes a metaphor that sticks too close to its original frame of reference, at least in one respect[88]:

> How about the folder? One of my longstanding pet hates is to have them behave anything like their physical counterparts. For example, as they existed in Officetalk, Star, Lisa, and Mac-like real folders-there is only one icon for a document or application and it can be in only one folder. This drives me crazy, because the probability of not finding what you are looking for by browsing has just been maximized! It is trivial to have as many icon instances for a given doc or app in as many folders as one wishes. They should be near any place where they might be useful. (Dragging a singleton out on the desktop is not a solution to this problem!)

And like their linguistic counterparts, interface metaphors can die, which means that their form remains to exist while the connection to the tenor, the original concept, gets lost. The office metaphor was developed in the early 1970s but some of the imagery it uses and the mechanics of office work it refers to, such as folders, have their origin in much earlier centuries. To a generation growing up without physical filing systems the folder will simply turn into a dead metaphor and the image begins to stand in for the real thing again. Once the desktop metaphor is internalised by the user, once it has undergone its death as a metaphor, the principles of interaction determined by the metaphor are not seen as an auxiliary construction but as the inherent structure of the computer itself. The desktop metaphor becomes the computer. Thus, the framework which originally existed in order to keep metaphor consistency turns into an obstruction hindering the system to evolve along with the user's increasing competence (Hollan & Pederson, 1997, p. 46). Or from a user's point of view, the desktop metaphor provides an easy entry point into the workings of the computer but gets in the way of a deeper understanding of its possibilities and capabilities. Raskin (2000, p. 70) warns that it is 'more important that we make sure that these systems can be efficiently used in the long run.' The desktop metaphor serves as an easy entry point but while the user becomes more experienced and the new media environment itself more complex, the danger is that the desktop metaphor might turn into a huge legacy system which will

[88] The designers of the desktop have allowed themselves some freedom with regards to the real world when it comes to the Babooshka-doll-like folder-inside-a-folder structure which does not relate to the actual practice of handling real folders.

be hard to overcome. In short, 'what you gain now, you pay for later' (Laurel, 1993, p. 131). Or as Alan Kay (1990, p. 198) puts it, 'now that the Mac way of doing things has taken hold, will we ever be able to get rid of it?'

4.7 Interacting with Icons

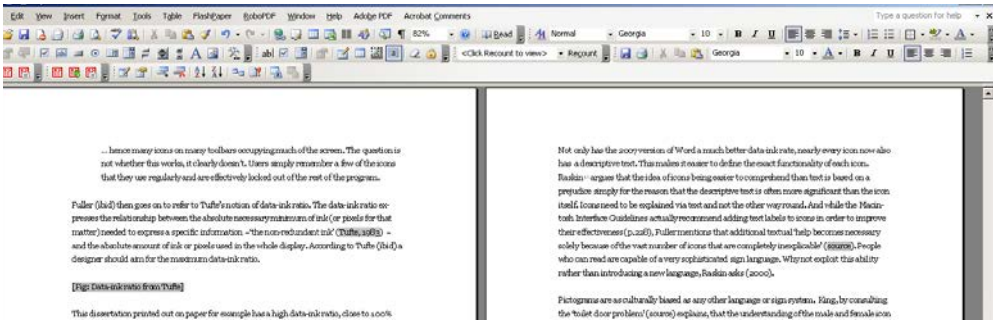
It has been explained in chapter three that iconic communication systems are not unproblematic and the desktop is not the only application which has to deal with them. Microsoft Office, particularly up to version 2003 or 10.0 (figure 25), is notorious for its amassment of icons. The cluttering of the interface with icons causes exactly the opposite of what was intended:

> ... hence many icons on many toolbars occupying much of the screen. The question is not whether this works, it clearly doesn't. Users simply remember a few of the icons that they use regularly and are effectively locked out of the rest of the program. (Fuller, 2001)

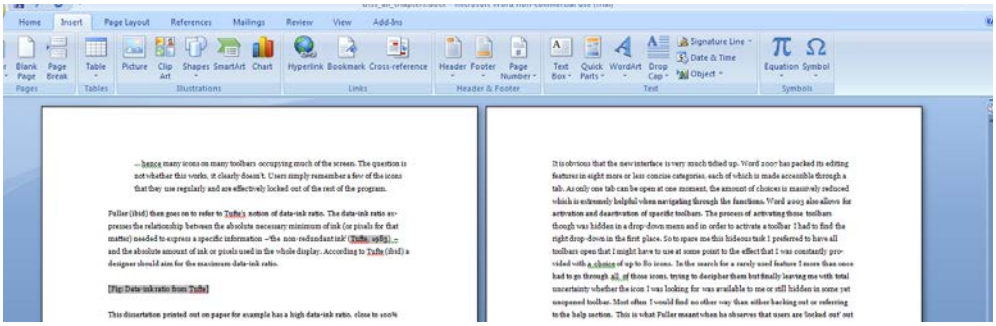
Icon congestion on the screen leads to a lack of transparency. It is not only the user's view on the content that gets blocked but access to the functionalities of the system itself. Fuller (2001) explains why this is the case by referring to Tufte's notion of data-ink ratio. The data-ink ratio expresses the relationship between the absolute necessary minimum of ink (or pixels for that matter) needed to express specific information, 'the non-redundant ink' (Tufte, 1983, p. 93), and the absolute amount of ink or pixels used in the whole display. According to Tufte (ibid, p. 96), designers should aim for maximizing the data-ink ratio.

This dissertation printed out on paper, for example, has a high data-ink ratio, close to 100% while the same content on the screen, framed by the icons and toolbars of Word and the operating system, has to compete with all this additional visual information. Fuller (2001) proposes to slightly modify Tufte's concept for the usage in interface design to the effect that 'an interface can be costed against the amount of pixels in the toolbar that it changes from the uniform background'. It seems that Microsoft has adhered to Fuller's advice if one looks at the new Microsoft Office 2007 package (figure 26).

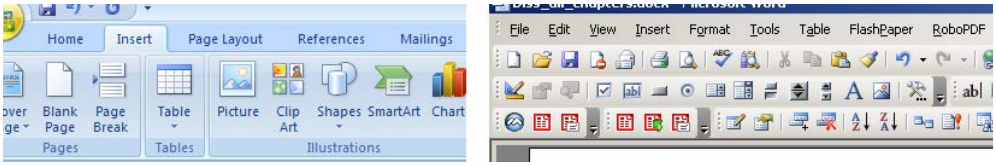
The new interface is very much tidied up. Word 2007 has packed its editing fea-



ıre 25: *Microsoft Word 2003*. The icons in the toolbars strongly contrast with the slight grey background which makes n come to the fore. Also, the process of activating the toolbars or ribbons is hidden in a drop-down menu and in order to vate one of them, the user has to find the right drop-down in the first place. This leaves him in total limbo as to what the lable functionalities are. So either he leaves open as many ribbons as possible to see all the available features, which ı leads to the visual overkill of up to 80 icons and more, or he has a reduced number of ribbons open which in the worst results in having to browse through several drop-down menus in order to find a specific functionality. (Image source: enshot from Microsoft Office application)



ıre 26: *Microsoft Word 2007*. The icons blend much more into the background which gives the text a higher visibility.
age source: screenshot from Microsoft Office application)



ıre 27: Clippings of the header sections of *MS Word 2007* (left) and *Word 2003* (right). Besides introducing a system of ; resting on a ribbon and, thus, drastically reducing the amounts of visible icons, the 2007 version has added text to rly every icon. (Image source: screenshots from Microsoft Office application)

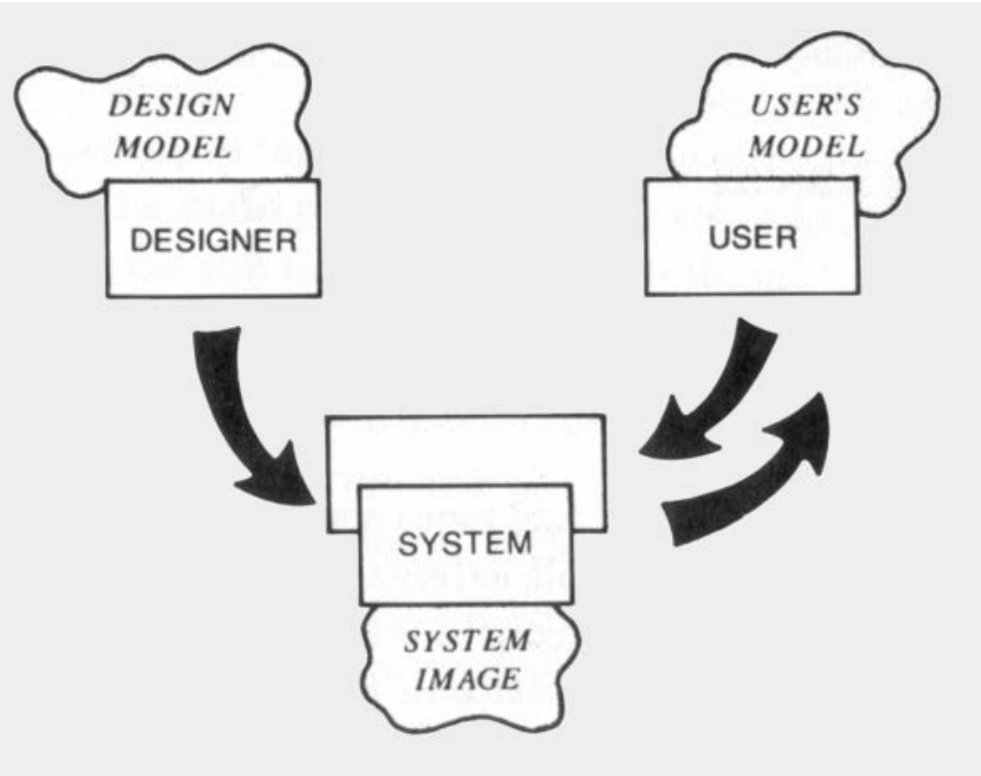
tures in eight more or less concise categories along a navigation ribbon, each of which is made accessible through a tab. As only one tab is visible at one time, the amount of visible choices is massively reduced which is helpful when navigating through the functions. The interface of Word 2003 in comparison is a nearly impenetrable mish-mash of icons. Not only has the 2007 version of Word a much better data-ink rate (figure 27), interestingly, nearly every icon now has an added descriptive text. This makes it easier to define the exact functionality of each icon. Raskin[89] argues that the idea of icons being easier to comprehend than text is based on a prejudice simply for the reason that the descriptive text is often more significant than the icon itself. Icons need to be explained via text and not the other way round. And while the Macintosh Interface Guidelines (Apple, 1992, p. 228) actually recommend adding text labels to icons in order to improve their effectiveness, Fuller (2001) mentions that additional textual 'help becomes necessary solely because of the vast number of icons that are completely inexplicable'. People who can read are capable of a very sophisticated sign language. Why not exploit this ability rather than introducing a new language, Raskin (2000, pp. 168) asks.

Morville and Rosenfeld (2006, pp. 97), in their standard work for information architects, are similarly sceptical of the helpfulness of icons when it comes to navigating content. They confirm that icons 'constitute a much more limited language than text' and recommend their use only with navigational systems which offer a much reduced amount of options. Similar to Raskin, they emphasise that icons are a visual language which has to be learned while phonetic text is a readily available symbolic system. Thus, an iconic vocabulary should only be introduced in the cases where there is 'a patient, loyal audience of users who are willing to learn your visual language' (ibid).

4.8 Alternative Design Approaches

There are alternatives to the metaphor and icon based design approach towards information interfaces. One of them is the idea of the mental model. The concept, as described by Norman (1998), assumes that people have specific conceptual models of how the world operates based on prior experience (figure 28). With the user's mental

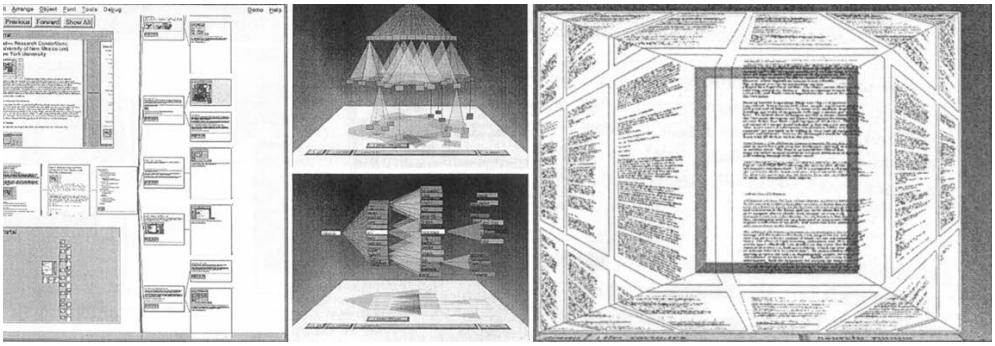
[89] Raskin was a project manager with Apple in the late 1970s and he was the one to point the attention of Apple founder Steve Jobs to the GUI and the Star interface at Xerox Parc (Tuck, 2001). He later went on to develop his own interface devoid of the desktop metaphor and icons which he originally helped to promote.



ıre 28: *Mental models* as a design approach according to Norman. The designer develops the system in reference to ;t he thinks are existing functional concepts and models about the world in the mind of the user. (Image source: Nor-ı, 1998, p. 190)

model in mind the designer conceptualises a design model which is then implemented into the system. The hope is that in utilising user models the designer of an interface can fall back on existing knowledge which makes it easier for the user to understand the interaction. The idea of direct object manipulation, for example, is based on the concept of moving around physical objects on a surface just like a pen and a piece of paper on a desktop. It is rather unclear though, where the borders between a metaphor-based approach and a concept based on mental models are situated. The designers of the *Xerox-Star*, for example, who came up with the GUI, mention that they considerably relied on the ideas of mental modelling (Smith, 1982, pp. 248). In that sense a mental model is the method with the metaphor being the result whereas with a metaphor based design approach, metaphor itself would be the method. This explanation indicates one of the problems with mental models. It is actually hard to define what they exactly mean while Nardi and Zarmer (1990) argue that there is no such thing as a mental model at all.

Hollan and Bedersen (1997) offer an 'informational physics strategy' for the design of complex information structures (figure 29). Their research concentrates on various ways to visualise, filter and structure huge amounts of information by 'tapping into people's natural spatial abilities' (ibid., p. 35) and by generally appropriating human knowledge of the physical world. Accordingly, they experiment with abstract representations of physical phenomena such as zooming and lenses. Another of their concerns are history-enriched digital objects (ibid., pp. 43), meaning the embedding of the history of interaction within the digital interface. Their main argument is that a metaphor based approach is relying too much on mimicking earlier media or the real world while digital media are now entering a phase where designers and users should learn to appropriate the new potentials offered by digital media. Hollan and Bedersen want to move towards 'new representational mechanisms that do not necessarily have origins or analogues in the mechanisms of earlier static media' (ibid, p. 45). Strictly speaking, this approach, like any, does contain metaphors and Hollan and Bederson (ibid, p. 46) admit as much. However, other than the desktop metaphor, this approach is not at all trying to transfer visual likeness of the real world into the computer which is the main aim of the desktop metaphor. It is an approach which very much relates to Lakoff's (1987, p. 267) earlier mentioned explanation (see chapter 4) of the development of language on the basis of embodied experience of the world. Rather than turning text into image, this design model attempts to extend existing information structures, such as alphabetic text, by adding physical handles and usage history.



ıre 29: An *informational physics* approach towards interface design. The *Pad++* interface for zoom-in browsing (left), e trees as a three-dimensional view on hierarchies (middle) and the document lens (right) by Hollan and Bederson. age source: Hollan & Bedersen, 1997)

In the context of physically handling data, another approach towards interface design cannot remain unmentioned. Whether using the GUI or more abstract representations, the traditional setup of keyboard, screen and mouse forces the user to interact via virtual objects on a screen while the interaction itself is mediated and remote controlled through keyboard and mouse. Tangible computing now shifts the representation from the iconic back to the enactive. It produces a direct hands-on experience towards manipulating information through building, as Dourish says (2001, p. 44), 'in-'information artifacts based on physical manipulation'. Thus, information can be touched and manipulated directly. One of the most renowned examples, even though only a design concept, is Durrell Bishop's answering machine (figure 30) which represents recorded messages in the form of marbles. Another proponent of this approach is the Tangible Media Group of the MIT Media Lab, which has produced various prototypes from tangible objects to whole responsive environments. Paul Dourish (2001) in his seminal book *Where the Action is* takes the idea of embodied interaction further, in that he argues that any interaction design should not solely deal with the relationship between an isolated user and a computer because human actions are not only embedded into a specific physical environment but also into a cultural and social context. Particularly video games are increasingly embracing principles of embodied interaction, such as for example *Dance Dance Revolution*[90] and the *Wii*[91] interface, but also other consumer products like Apples *iPhone* and *iPod touch* are taking advantage of direct physical manipulation of digital objects. To bring it back into the context of this thesis, embodied interaction is an extension of Hollan and Bedersen's (1997, p. 35) 'informational physics' and a more direct way of 'tapping into people's natural spa-

[90] '*Dance Dance Revolution*, a.k.a. *DDR*... is a music video game series produced by Konami... The game is played on a dance pad with four arrow panels in a cross barby formation: left, right, up, and down, eight arrows (two 4-arrow pads), or six arrows (the 4 main directions plus up-left and up-right diagonal panels, known as solo mode). These panels are pressed using the player's feet, in response to arrows that appear on the screen in front of the player. The arrows are synchronized to the general rhythm or beat of a chosen song, and success is dependent on the player's ability to time and position his or her steps accordingly. In *Dance Dance Revolution*, a player must move his or her feet to a set pattern, stepping in time to the general rhythm or beat of a song. During normal gameplay, arrows scroll upwards from the bottom of the screen and pass over stationary, transparent arrows near the top (referred to as the *guide arrows* or *receptors*). When the scrolling arrows overlap the stationary ones, the player must step on the corresponding arrows on the dance platform. Successfully hitting the arrows in time with the music fills the *Dance Gauge*, or *life bar*, while failure to do so drains it.' ('Dance Dance Revolution', <http://www.Wikipedia.com>).
(As a rule, this thesis does not refer to Wikipedia. This is an exception, as DDR is not referred to in standard reference literature, nor is the usage explained in detail on the producer's website. The author of this thesis has experienced the product first hand and can vouch for the accuracy of the description)

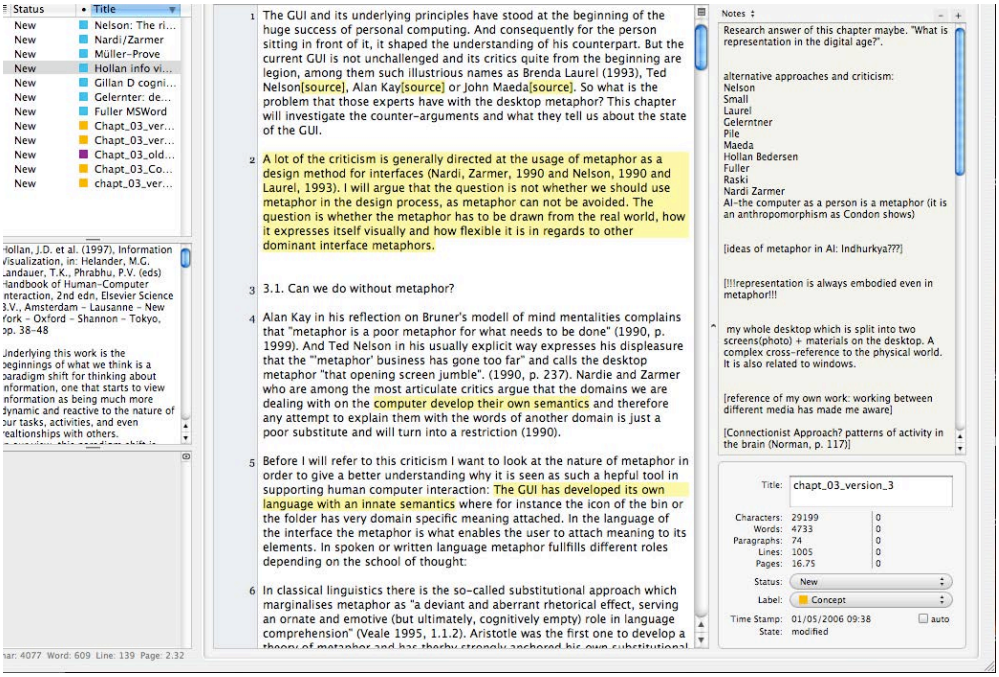
[91] See chapter 3.10

tial abilities'. However, tangible computing remains a form of representation of both digital data and the ways of manipulating them. Those representations often make very obvious use of metaphors. The *ambientROOM* (Ishii et al., 1998), for example, by the Tangible Media Group at the MIT Media Lab explores how background activities can be discreetly supported by objects and the room ambience. For instance, in order to monitor computer network traffic, a user would have to uncork a bottle. Instantly, he would hear the noise of street traffic as if it were to flow from inside the bottle. The noise varies in relation to the traffic of the computer network. Both the bottle, as well as the sound of street traffic, are metaphoric representations.

While the proponents of informational physics as well as tangible computing do not have a general problem with the idea that their solutions might contain metaphors, Nardi and Zarmer (1990) strictly oppose any kind of metaphor-based design for information interfaces. They think that the focus should be on the complex semantics of digital data which they say do not have any real equivalence in the real world. The alternative they offer is based on Harel's (1988) concept of visual formalisms, which they describe as 'diagrammatic notations' (ibid, p. 2) including formal representations such as graphs, tables and lists. Visual formalisms try to define the visual interface of data along both the data relations which need to be established and the operations which have to be executed (ibid, p.20). Nardi and Zarmer (ibid, p. 15) fiercely deny that their approach contains any kind of implicit metaphors:

> It is a mistake to think of a paper form as a metaphor for an electronic form. The paper form is a correct model of what is wanted electronically... The functionality of the paper form will be extended and enhanced in the electronic version, and the paper form itself will continue to exist as another version of the information. The paper form does not become irrelevant to experienced users... the paper form is exactly that which the computer models and extends.

The problem with Nardi and Zarmer's argument is that it assumes that there is a kind of clue inherent to digital data, a kind of affordance which inevitably leads to a specific interface. Their claim that 'the paper form is a correct model of what is wanted electronically' might even have some truth from a 1990s perspective where many computers were still stand-alone solutions and documents were written to be printed out. The situation since has dramatically changed and has become much more complex. On



ıre 31: An alternative approach to word processing. Microsoft Word, as the market leading word processor, has been shly criticized for its feature overload and difficult interface (Fuller, 2001). *Ulysses* makes away with pages and format-. This product, aimed at creative and scientific writers, concentrates on the organization of the text rather than on its ts and gets by without any icons. (Image source: screenshot from Ulysses application)

one side, more and more data is digitally-borne in content management systems, such as blogs and Wikis, for instance. Those data are not just documents briefly assembled in a word processor in order to be printed. The reading often happens on the screen now. On the other side, the dream of the paperless office has not materialised yet. Sixteen years after the above comments, people seem to be reading more from paper than ever. Office paper consumption has more than doubled from 1980 to 1998 (Sellen & Harper, 2002, pp. 11). The print-out has meanwhile become one specific format among many others. What is needed now is no longer the paper format, but an extremely flexible treatment of text which allows it to easily flow into any kind of format. And even software such as Microsoft Word, originally developed in times when word processing meant writing for printed documents, offers several different preview options such as *print layout*, *full screen reading*, *web layout*, *outline* and *draft*. Some of these options such as *web layout* or *outline* do not visually resemble a piece of paper any longer.

The software Ulysses is a good example that even a word processor can be designed without the use of icons at all. Ulysses is an alternative product to Microsoft Word, concentrating on the very specific niche of creative writing. Its approach is to go beyond the general fixation on a page-based layout (figure 31). Blue-Tec (<www.blue-tec.com/ulysses>), the producer of Ulysses, also found that the myriad of formatting and layout options of Word and similar products were a distraction from the actual process of writing. Hence, they disposed of nearly all formatting variables and left the formatting of the text to the output stage. The interface is divided into various reading windows and side panels, whilst allowing for a comparative view on different documents, notes and sources without a muddle of overlapping windows. Even the writing pane is split up horizontally, giving access to two different sections of the text which the writer is working on. The software concentrates on the writing itself, on the relationships between notes and written text, and the fact that writing itself is often a process that very much struggles with the neat sequential structure of the final outcome.[92]It is interesting to see that all the interface approaches discussed so far, relate

[92] However, the straightforward approach of Ulysses is not without complications. The problem is that the main text turns into a flow of words with no beginning and no end, which can be disorientating. In a document like this thesis, the separation into pages is extremely helpful as a way to navigate the text. The paragraphs have different lengths, the indentations of quotes change the relationship between printed and white space and the headlines and footnotes emphasise specific areas of the page. These typographic properties, together with the division into specific pages and the images, construct a very unique topography which helps the writer to orientate himself while writing, whether the final form of use is paper-based or not. These impressions are further supported by Sellen and Harper (2002, pp. 75) who found in user tests that navigation through sheets of paper proves much quicker than browsing through the same text on a screen. They identify reading as an em-

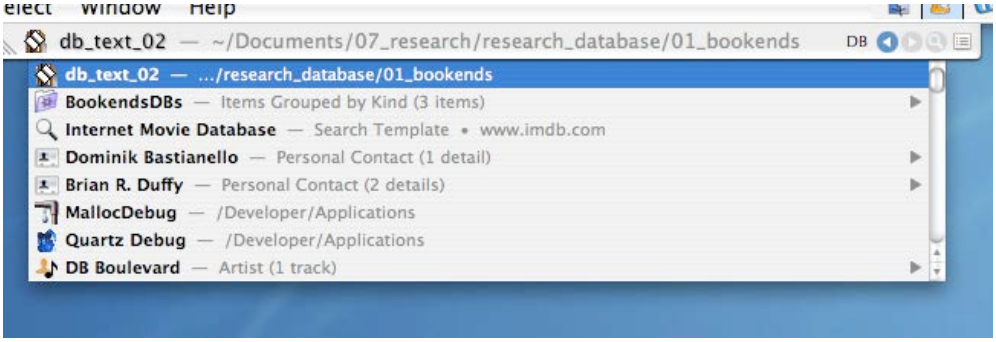
to Bruner's idea of different modes of interaction with the world. The real-world metaphor is an iconic display which is at the same time enactive. Embodied interaction, as in the answering machine example, is very much *enactive*. Informational physics or visual formalisms lean strongly towards *symbolic* interaction, even though these approaches also contain elements of enactive and iconic interfaces. The choice of interaction mode very much depends on the context but also on the general computer literacy of the audience. The following demonstrates that the context of personal computing is currently undergoing a huge change and that the pressure mounts on the iconic GUI which has problems to cope with the needs of networked computing.

4.9 Beyond Enactive and Iconic Interaction

Nardi and Zarmer (1990, p. 13) argue that the choice of interface also depends on whether it is supposed to work on a syntactic or a semantic level. A syntactic interface deals with the operating of the system and how its elements relate, i.e. the desktop gives an overview of and access to documents and applications available and thus, is a syntactic interface. The semantic interface on the other hand is responsible for displaying and manipulating content. I.e. MS Word is a semantic interface mainly concerned with text while MS Excel represents a semantic interface for dealing with numerical data. For syntactic interfaces, Nardi and Zarmer (ibid) acknowledge that a metaphorical approach might be helpful in supporting overall orientation, especially for beginners.

But even with syntactic interfaces, data organisation based on visual metaphors increasingly runs into trouble. When it comes to huge amounts and large structures of data, their handling via enactive and iconic systems becomes problematic if not impossible. Documents and files can easily get lost in a complex hierarchic folder structure. Metaphors of physical space are very much restrictive in the way documents can be displayed. There are only so many objects which can be made accessible for the eye at one time on a two-dimensional plane such as a desktop. In the real world, in order to extend capabilities people start piling up documents horizontally (folders) or vertically (stacks). Humans are used to lay out and organise objects in three-dimensional physical space. It has been shown that one of the advantages of physical paper is that it

bodied experience: 'when we read, we work our way through a text using both our hands and our eyes' (ibid, p. 101).



ıre 32: To activate the *LaunchBar* application the user holds the Apple-key and hits the Space-key. In order to search open a document or an application he then simply types an arbitrary abbreviation of the desired file name such as M-S- or *M*icro*s*oft *W*ord or D-I-5 for the file *di*ssertation_05. LaunchBar instantly provides the user with a menu of all the ıments it considers to be related to the abbreviation. The most used as well as the most recently used are placed towards top. The menu is navigated with the up and down key. The tool can also be trained so that specific documents appear on but most often LaunchBar immediately comes up with the right solution on top anyway. Whatever document is on top easily be opened with a hit of the return key. The whole process is extremely quick and straightforward. Opening a ·ific document which is hidden somewhere in the depth of the hierarchy of the folder structure takes only the time it ds to quickly hit a few keys: Apple-space-D-i-5-return; a matter of a second and no mouse operations involved. (Image rce: screenshot from LaunchBar application)

supports this need (Sellen & Harper, 2002). The miniaturised and iconic desktop simply cannot provide for the same physical and spatial experience and it should not, as the task of the metaphor is to combine properties and not to imitate. And in the light of the ever-increasing amount of data on the Web and on individual PCs, hierarchical or otherwise laid out data structures become less and less accessible.

It does not surprise then that syntactic interfaces are increasingly bypassing the graphic user interface. Google desktop and Apple's Spotlight allow a fully text based search of documents on the computer without having to dive into a hierarchical structure and without having to click through folders or dragging content around. Alphabetic text, as it has been shown in chapter four, is a higher form of organising information which produces predictable structures which can be manipulated and otherwise utilized easily by computers. Programmers have always been interacting with computers via text through the command line and they still do so, which is an indication that direct instruction via written text is still one of the most straightforward approaches towards interacting with computers. A brilliant example is the little LaunchBar shareware for the Apple (figure 32)[93]. While its interface is mainly a search text field, it is more than just a search engine. LaunchBar opens and finds documents and files on the basis of abbreviations. Opening Microsoft Word for example can be done by simply typing something like *M-W* or *M-S-W*. The user does not have to know the exact abbreviation. There is a lot of leeway and the tool can be trained as well. Thus, finding and opening a document is always at least as quick as clicking an object but mostly much quicker if the document is somewhere hidden deep down in the folder structure.

The biggest data space of all, the Web that is, is organised wholly on text-based semantics. Google for this purpose uses its PageRank[94] algorithm which is constructed on the assumption that the validity of a site can be measured by the amounts of cross-references or hyperlinks it receives from other sites. Google identifies and correlates each site according to the words used in the text and the site with the highest amount of cross-references shows up on top[95]. Thus, each search conducts a kind of popularity

93 An equivalent software for the PC would be the *Launchy* application.

94 'PageRank is a numeric value that represents how important Google says a page is on the Web. Pages with high PageRank display early in search results. The Google search engine's proprietary search algorithm not only considers keywords when determining PageRank, it also considers the number of other sites that link to a page and the words used in the link description.' ('Google bomb', <http://www.whatis.com>)

95 Roxanne O'Connell (2006) describes some of the intricacies of Google-search in more detail: 'The other important information for making your pages relevant to Google (or other search engines) is relevancy of key words and frequency of key words. Last time I checked -- and that was maybe a year ago -- the magic number for frequency of relevant key words was something like 3.1% or thereabouts. So if you had the phrase "Thomas

ranking. The more *buddies* a node in the network has and the higher the quality of the buddies, measured by the amount of referencing those buddies attract, the more popular it is and the more relevant. There are also attempts to use technologies such as XML[96] and RDF[97] in order to organise and comment on the whole content of websites in a way that they become machine readable and can be better found and indexed by information retrieval software such as Google. The idea behind it is to form a so called semantic web based on both active human description via metadata and intelligent software. The semantic web is primarily based on the notion that a person or organisation responsible for a site adds semantic description.

In recent years though, the so called *Web 2.0* has brought with it a change in the approach to semantic descriptions. While the term Web 2.0, coined by O'Reilly (2005), is highly debated, it is difficult to ignore the shift as such. One of the main aspects of Web 2.0 is the 'harnessing [of] collective intelligence' (ibid), for example, through the practice of social tagging, which describes the practice of users collectively rating, discussing and classifying content (ibid, 2005). A lot of Web 2.0 applications are mainly organised around text. This is definitely the case with Del.icio.us, a platform where users exchange bookmarks, a process also called social tagging. But also very image heavy sites such as Flickr and YouTube show a very clear differentiation of alphabetic text and image as well as a very strong reliance on text and semantics as a way of navigating the content. It is important to understand that the images, respectively movies, on those sites, are not an argument in favour of a strong iconic turn. To the contrary, these sites are actually archives for images and movies and they

J. Farrell"on that page significantly less than 3 out of a hundred words (probably not relevant to the search) or significantly more (spamming), your page would not be highly ranked. AND key words that are in the visible copy of the page -- as HTML text (not an image or image tag) -- score higher than meta tags or anything the user cannot see rendered on the page. So text key words (and even higher rank are text key words that are linked) also get in the mix -- even if those links are to other pages in your website.'

96 'XML (Extensible Markup Language) is a flexible way to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere.'
('XML', <http://www.whatis.com>)

97 'The Resource Description Framework (RDF) is a general framework for how to describe any Internet resource such as a Web site and its content. An RDF description (such descriptions are often referred to as metadata, or "data about data") can include the authors of the resource, date of creation or updating, the organization of the pages on a site (the sitemap), information that describes content in terms of audience or content rating, key words for search engine data collection, subject categories, and so forth. The Resource Description Framework will make it possible for everyone to share Web site and other descriptions more easily and for software developers to build products that can use the metadata to provide better search engines and directories, to act as intelligent agents, and to give Web users more control of what they're viewing. The RDF is an application of another technology, the Extensible Markup Language (XML)'
('RDF', <http://www.whatis.com>)

are organised with the help of text. The imagery is named, further semantic information is added via written tags and finally it is discussed by the community via text which further adds to the semantic description and textual classification of the content. Thus, the archiving of this image material in combination with semantic tagging is just a further human attempt to attach text-based semantics to the rather diffuse visual world surrounding it. It is in the words of Flusser (2003), a denotative criticism of the image.

4.10 Competing Metaphors: the Office and the Network

Looking closely, one will actually recognize that the desktop metaphor, and with it the GUI, are already bursting at the seams, particularly since more and more emphasis is put on networking. In the beginning, the *personal* computer was a stand-alone solution by name and nature. Similarly, the desktop metaphor centres on the idea of an individual personal space in the real world, ones own office. A personal office in the real world is more or less a containable space. It is genuinely human sized and organised around the capacities of human beings and the available space. If the shelves and drawers of the office are full, this means that folders, files, papers, books have to be physically thrown away or moved into an archival space. The desktop metaphor was modelled after this physical space: desktop, documents, folders, a bin. Similarly, word processors would try to emulate the *real* document. Thus, PCs for a long time were used as individual work stations. Exchanging data was a physical act. Floppy disks or other storage devices would be carried from one computer to the next, just like the clerk in the 19th century would have to carry a piece of paper or a folder from one desk to another. It is from this background that the Macintosh metaphor mismatch mentioned earlier has to be understood, the fact that is, that in order to eject a disk the user had to pull it onto the bin icon. It stands to reason that this metaphorical act was chosen because in the context of the personal computer, transferring data meant an act of physically removing data from the PC. Pulling the disc onto the bin was the strongest statement that could be made to emphasise this act of separation.

But even before the *personal* computer and the GUI became a success, the technical basis for a fundamentally different approach to computing which would have a decisive impact on the further development of interfaces, had already been laid out. The Internet started as early as 1969 with a connection between the University of California and Stanford (Naughton, 1999, pp. 138) and universities and companies soon

realised the benefit of connecting individual workstations into networks. But for some time, and particularly in the early years of personal computing, many computers were still isolated workstations, faithful to the original interface metaphor of personal desktop. The idea that texts would, to a large extent, be outsourced to and available through an all embracing network, seemed like a manic dream as recently as the early 1990s. In 1992, Landow (1992, p. 76) described Heim's (1987, p. 215) vision of a comprehensive digital space which would contain a 'linkage with the total textuality of human expressions' a thing of a 'bizarrely inefficient dystopic future':

> ..."future" because today few people writing with word processors participate very frequently in the lesser versions of such information networks that already exist, and "bizarrely inefficient" because one would have to assume that the billions and billions of words we would write all have equal ability to clutter the major resource that such networks will be.

In the fifteen years since then, the situation has come amazingly close to this *bizarre* vision in the face of the daily cluttering of the Internet through personal conversations and monologues via forums, chat rooms and millions of more or less useful blogs, urging Landow (2006, p. 69), in his 3rd edition, into a u-turn by predicting that at some future point all texts would in some way be accessible through a network.

And with this change, slowly the relation between the individual personal computer and the network has changed. The first phase of networking was one of connecting the PCs to the Internet by dialling oneself in and out on demand. The network in this sense is seen as a conduit which transports information from A to B, from ones own computer to another computer or from the Internet down to one's own PC, thus expressing a certain distance between the two domains. But soon, the technology and with it the metaphors, have shifted ever further towards an integration of the PC into the network. From 1996 on, Allison and his company Oracle tried to propagate the concept of network computers (Girard, 1999) which would run any applications on demand from a server. The individual computer would thus, turn into a mere interface for a network via which it would access e-mail, documents and applications. Oracle was not able to sell on its idea on a big scale but meanwhile network computing has entered through the back door: blogs, forums, content management systems and collaborative writing projects in the form of Wikis have already moved a lot of user activity towards applications running directly from servers. And Google is now challenging

the killer stand-alone application which made Microsoft's success, the Office package. *Google Docs* is a web-based word processing and spreadsheet software which enables web-based word processing. The success of server-based office applications depends somewhat on whether constant online access can be guaranteed[98] and the related security issues can be resolved. But one could also imagine a hybrid solution that instantly synchronizes offline and online version on network access. However, fact is that more and more functionalities are increasingly sourced out to the network, thus turning the personal standalone computer into a network interface. Even the boundaries between hard drive and the network have started to disintegrate. Applications like Google Desktop and Apple's Spotlight treat the personal desktop and the Internet virtually as one domain.

This goes to show that, at least since the arrival of the World Wide Web in the early 1990s, the metaphor of a self-dependent individual work space fits less and less the reality of personal computing. The landscape is changing and the desktop metaphor is confronted with a totally different environment now. The Internet is not about objects in a defined space but about movement, openness, limitlessness. The two worlds are built upon totally different metaphorical concepts with regards to treating documents. The overall conceptual metaphor of the desktop is a physical one where documents manifest as icons in a two-dimensional space. It is a noun-based environment of documents, folders, objects manipulated by the user, whereas in comparison, the Web is described as an intrinsically verb and time-based experience. People *surf* the web and use *browsers* for *navigation* (Netscape Navigator) or *exploration* (Internet Explorer) or they just go on an exciting *holiday trip* (Apple's Safari). The web itself is often characterized as an *information highway* (Negroponte, 1995, p. 183). But this highway is always experienced as a movement through time[99]. There is no two-dimensional mapping of the web which would allow the user to visually navigate in space[100]. The individual websites are not organised in the form of iconic objects which could be located and acted upon. There are just numbers, IP-addresses which are transformed into textual URLs so that they conform to human forms of communica-

98 The concept could get a major boost should visions of ubiquitous free wireless network access (Broughan, 2006) become reality. The idea of city-wide wireless access had to face a setback in summer 2007 though, when the Internet provider EarthLink backed off from a project intending to provide San Francisco with a free wireless Internet network (Selna, 2007).

99 The artist and researcher Olia Lialina is currently working on a project on metaphors surrounding computers, specifically ones related to cars. (<http://www.contemporary-home-computing.org/car-metaphors>)

100 At least none that successfully made it into the mainstream. Such concepts exist though, as for example, Raskin's (2000, pp. 152) *Zoom World*. *Google Earth* allows for the mapping of specific websites onto a map of the Earth but this is different to the mapping of the Internet as such.

tion. It is the act of writing the name of a website into the navigation field of the browser which transfers the user to the desired destination and not the pointing at an object. One could say it is almost a magical act of conjuring a place by speaking out its name.

Müller-Prove (2005) pointed out some of the more tricky discrepancies between the two approaches. On the desktop there are objects which can be moved around. Therefore, the first click on a folder or a document serves to activate the object whereas it needs a double-click to open it. A link on a website though, only needs one click, as the user is simply moving from place to place rather than opening documents. Also, in the context of the desktop metaphor, icon and window are two display formats of the same document. The application window has a very strong attachment to one document, which again relates to the idea of manipulating an object. Moving through the web though, the window becomes something like a reusable image frame, displaying a succession of different documents.[101]

The idea of the icon-based desktop as a kind of epitome of interaction with computers shows only how much it has become a dead metaphor. The desktop has become a synonym for human computer interaction. There are signs though, that humans are increasingly used to dealing with data objects in regards to written semantics rather than to physical iconic objects. The noun and object-based spatial metaphors surrounding the GUI increasingly get into conflict with the verbal, time-based metaphors of the Internet, with the latter encouraging a written expression rather than a visual one.

4.11 Conclusion

The iconic nature of the desktop as the backdrop of all interactions with modern PCs cannot be taken for granted. A lot of the presumptions on which the current dominant interface paradigm is based are crumbling. As much as a visual metaphor is a quick fix to introduce a new and complex machine to a world of computer laymen, it now often seems like a remnant from an early age. In recent years, the personal computer resembling an office has turned into a thoroughfare for the Internet. What used to be a

[101] Müller-Prove (2005) also raises the issue that browsers remember the order of visited sites and offer back and forward functionality to move through the history. In acting upon documents on the desktop though one has to use undo and redo functions. Both functions he thinks are semantically so close to the idea of history, that they should be combined. I do disagree on this point as editing and reading a text are semantically very different operations. Here the wiki might serve as a model: while forward and backwards – history that is – works on a horizontal level, recent versions of the wiki appear as a vertical level.

physical place, an office, is now very much affected by the Web being a domain where items are not positioned spatially but semantically. So, rather than setting the scene for an increasing use of iconic language, as Bolter would have it, the desktop is under increasing pressure from interfaces which organise data around semantics and alphanumeric writing. The Web increasingly turns into a database of all other media, text, image, audio and video, the lion share of which is organised around semantics expressed through text. The browsing of such databases via the means of iconic or enactive interaction is becoming more and more difficult.

It will be interesting to see how this development will further affect the design of computer interfaces. But also on an application level, a change in thinking seems to take place. The latest version of Office has a much more subdued interface with a much stronger reliance on text. There is enough evidence to believe that the coming decade will probably see an increasing use of textual interaction with the computer. Donald Norman (2007), one of the pioneers of interface design and always at the cutting edge with his publications, predicts that the next big thing in human computer interaction is actually the command line interface. Similar to what has been described in this chapter, he sees more and more evidence for text-based navigation. It will have to be seen, whether there is a need to support beginners with an enactive visual metaphor representing the physical world for much longer. As abstract, symbolic interfaces have become ubiquitous, users seem to become more and more able to directly engage with computers on a highly abstract level or maybe it is simply that they have begun to understand that the Web is a semantic space which is most efficiently dealt with by the means of language. Besides text, informational physics, as described by Hollan and Bedersen (1997), as well features of direct, tangible interaction, will play a more important role.

5.0 DESIGN 2.0: FACILITATING DATA FLOW

5.1 Introduction

In the 1980s, the notion of desktop publishing saw the whole print design and preproduction process shift to the personal computer. Thus, the working environment for the graphic designer changed dramatically whilst the end product remained the same: a printed piece of paper. But soon the Web provided digital computing with its own generic publishing environment. Print designers became web designers. What effect did this transition have on the graphic designer and his visual product? To what effect does the designer use his new tools and his old knowledge? A rather simple answer would be that digital design, through its abundance of possibilities, automatically fosters a very rich and expressive visual output which emanates in both directions, print and digital media. Thus, digital graphic design is seen as a power pushing towards a strong iconic turn. This is what among others Blackwell (2000) and Bolter (2001) are indicating. This chapter investigates this viewpoint. It looks at how the graphic design profession has changed under the influence not only of new tools but of totally new media.

5.2 The end of print: Post-alphabetic Design

The developments of early web design in the 1990s are inextricably connected to the state of print design at the same time. This is not least because the Web was a new media and the profession of the web designer did not exist. Accordingly, many print designers did (and do) cross the lines, bringing their skills and attitude to a new medium. Arguably, one of the most credited and, at the same time criticized graphic designers of the 1990s is David Carson. Carson, mostly self-taught, first became known for his work on the music magazine *Ray Gun*. In this magazine he extended the work of typographical deconstruction which designers such as Brody or schools such as Cranbrook and CalArts, had started. Texts were cut apart, blurred, turned on their head or morphed into images. Type height was reduced to nearly illegible size, page numbers were abandoned. Content and legibility were of less concern (figure 41). While Carson first developed his style in a particular niche of American youth culture, it later found its way into mainstream media, for example, through Carson's

ıre 34: Several magazine cover designs taken from *The End of Print: The Grafik Design of David Carson*. There are ɡestions that Carson's style is not only visual expression of the demise of the age of print but also the harbinger of what ɔ be expected from design in the digital age. If Carson's work is anything to go by then digital media is pushing ever ɗer towards an amalgamation of text and image. (Image source: Blackwell, 2000)

Nike adverts and Wired magazine which adapted a similar style. Carson was often accused of a 'style over content' attitude (Blackwell, 2000) but the more interesting aspect in this context is the cultural interpretation that his work has provoked. The big Carson monograph by Blackwell (2000)[102], first published in 1995 and reconfirmed by a second revised edition in 2000, very programmatically announces 'The End of Print'. Another notion used in this context is the one of 'post-alphabetic design' (Kirschenbaum, 2000). Blackwell (2000) himself saw Carson as a forecaster of 'a radical evolution in visual culture'[103]. Print has exhausted its possibilities and broadband will bring with it 'rich, fluid graphics which can incorporate both still and motion media to deliver visuals more intense than traditional print' (ibid). The print era has reached its end not in a literal sense, because media most often do not die. As was mentioned earlier, they are more likely to undergo a process of remediation in which media learn from each other and pick up style elements and techniques (Bolter & Grusin, 2000).

Blackwell's comments imply that Carson's work for print envisions the possibilities of digital media. Print though, is a much narrower communication channel than digital media as it, for example, does not include the same interactive properties or moving images. Thus Carson's visions for the digital age, expressed through the medium of print, might simply go beyond the capabilities of this medium. And accordingly, Carson is seen as working 'at the edge of our visual culture' (Blackwell, 2000, p. 52). Blackwell (2000, p. 5) has no doubt that the digital media would soon provide the proper canvas for Carson's exuberant style:

> When the much-vaunted broadband communication comes along worldwide, it will be possible to have rich, fluid graphics that can incorporate both still and motion media to deliver visuals more intense than traditional print.

No wonder that Bolter (2001, p. 52) also calls on Carson as a witness with regards to the treatment of 'text as an image'.

This argumentation raises a few very important issues which relate directly to the theme of this thesis and which are to be discussed in the following. The first point is that if Carson's artistic predictions really have become true, as Blackwell presumes, and if digital media abet Carson-like design strategies then digital media, and particu-

[102] Blackwell's book which is designed by Carson does not contain page numbers. One would assume that this is a statement rather than neglect.

[103] The term *radical evolution* is either a misprint or a contradiction in terms.

larly the Web, should have meanwhile adapted to an expressive use of typography and an amalgamation of text and image. The second point implicit in this argument is that a richness of technical possibilities necessarily finds its expression in visual richness. This notion assumes that the merger of text and image is somewhat technology driven. A third point is Carson's (Blackwell, 2000) claim that design is an art form and thus, a way of self-expression. Regarding the latter issue, it would surely be interesting to discuss what defines the aura of an artwork in digital media but this is beyond the scope of this thesis and so this particular matter will not be of further interest. It is up to the designer whether he wants to call himself an artist and it is obviously up to his client to allow the designer to express himself or not. What should be discussed though, is the landscape in which the designer works and what kind of artistic freedom it allows for, specifically compared to print. This will shed light on the potential of web design to perform Carson-like feats and maybe even beyond that on text and image.

5.3 The Visual Richness of Digital Media

'The cybermagazines today are aggressively remediating the visual style of television and digital media. Every page of WIRED is a visual allegory for McLuhan's apothegm that the medium is the message.' (Bolter, 2001, p. 52) What Bolter points out here is that it was not only magazine layout that was undergoing deconstruction but the film format as well. In the late 1980s and the 1990s, MTV and other music video channels had established an extremely expressive format of video-clips with high-speed tracking shots and breathtaking cuts. This was the everyday backdrop on which theorists like Bolter, Landow and Glazier were judging the visual aspects of media. It is true that this time of total experimentation coincides with the time when digital layout, editing and image manipulation took over. It is also understandable that these phenomena led to a McLuhanesque take on digital media in the sense that it is them who provoke this visual overabundance in the first place.

This argument though, has some decisive flaws. It falls into exactly the same trap as the argument that hypertext is a way to overcome increasing complexity. Again, it follows a logic of outperformance as explained in chapter four. This line of thought generally suggests that visual complexity is a feasible approach to overcome structural complexity which is a theoretical short-circuit. If the interface becomes too complex and blocks the message, people will go away once they have played around with it enough. Why should they stay when the medium is the message and constantly repeats

itself? There is a parallel in history which Kirschenbaum (2000) reminds us of. In the early twentieth century the avant-garde reacted to the changes in print technology with a very expressive form of visual poetry, featuring the work of the likes of Mallarme, Apollinaire, the Dadaists, Futurists and Constructivists. Interestingly, this movement was followed by a period of typographic restraint, namely the international style and Swiss typography which leads to the following outburst by Drucker and its confirmation through Kirschenbaum (2000):

> "There is perhaps no more perverse (and successful) transformation of the formal radicality of early modernism into the seamless instrument of corporate capitalist enterprise than this progression from radical graphic aesthetics into Swiss-style modern design" (Drucker 238). Drucker is referring here to the cancellation (for it was essentially that) of the typographic experiments of such figures as Marinetti, Apollinaire, and Tzara - artists conspicuous for their intensive engagement with the graphical technologies of their own day — by the subsequent streamlined elegance of Jan Tschichold's New Typography and by Bauhaus.

There is the implicit idea in this argument, just like in the reasoning of the hypertext theorists and Glazier, that radical, expressive visual experimentation is a somewhat superior form of expression than formal restraint. It is actually very arrogant and too simplistic to describe minimalism in typography as a 'sign par excellence of [capitalist] surplus' (Drucker cited in Kirschenbaum, p. 2000). While economic need certainly does have a tendency to enforce efficiency, that does not mean that minimalism or more general, the modernist movement was a dishonest approach towards art and design. Traditional Japanese culture is also highly regarded for its clear and simple approach towards painting, interior and gardening and nobody would accuse it of 'streamlined elegance'. Similarly, concrete poetry shows that experimental layout does not necessarily have to express itself in visual lavishness. From the 1950s onwards, the concrete poets experimented heavily with text and layout based widely on basic sans serif typefaces or even monospace typewriter fonts (see chapter 6). Those poets were simply not interested in the formal aspects of typography. It is true that the expression 'less is more' is by far not the only approach towards design but neither is 'more is more'.

In this context it is somewhat telling that McLuhan is one of the few theorists who has made a huge impact on the mainstream design community. David Carson

(McLuhan & Carson, 2002), for example, has designed a whole book based on aphorisms by McLuhan. Bolter and Grusin (p. 76) even call him the 'patron saint of the information industry'. Marshall McLuhan has rightly been acclaimed for his visionary ideas, coining, for example, the term 'global village' (1962, pp. 31). But McLuhan's writing had, and has, to endure a lot of criticism albeit mostly not from the design community. Heim (1999, pp. 57) strongly challenges McLuhan's scientific credibility, claiming that the latter's 'cryptic style' is actually a sign for a lack of rigour. The main accusation though, is one of technological determinism (Aarseth, 1997, p. 14; Bolter & Grusin, 2000, pp. 75) which refers to McLuhan's underlying core notion that media themselves are the driving force of social developments, an argument which has been eloquently countered more than once (Williams, 1974; Aarseth, 1997, p. 14)[104]. But for some graphic designers, the notion of technological determinism is just too appealing. A profession, which is by its nature concentrating on the appearance of things, naturally leans towards the medium itself and its visual possibilities rather than towards the actual messages conveyed by it.

5.4 Techno, Drugs and Kai Power Tools

The visual graphic experimentations of people like Carson were definitely fuelled by the rich possibilities of digital media. But at the end of the day it is the designer who makes the decisions and not the medium and so the question to ask is why designers like Carson made those design decisions in the 1990s. It will now be argued that the arrival of desktop publishing simply dazzled the design community. In the sense of being an interface to their work, the new design tools were totally opaque to them. Designers first had to learn to understand their new medium. They literally had to play around for some time before they could go back to work. This was not only an issue for a few cutting edge designers. It was the spirit of a whole time, of which Techno design is arguably one of the most fascinating, even bizarre, visual expressions. While Techno music had its origins in Detroit, it developed its very own musical and visual forms in continental Europe, specifically in middle Europe. As the name says, Techno was the

[104] An alternative theory devised by Heim (pp. 46) is that of *transformative technologies*. He rejects the idea of direct causal chains leading from media technologies to human society and their use of 'cultural forms' and implies a more equal interplay between humans and their communication technologies. Williams (1974, p. 14) similarly rejects technological determinism: 'Such an interpretation would differ from technological determinism in that it would restore intention to the process of research and development. The technology would be seen, that is to say, as being looked for and developed with certain purposes and practices already in mind.'

celebration of technology. It was the reaction of a young generation who fully embraced the infinite potential offered by digital technology and they turned new media into a never-ending party. With the staccato of electronically produced beats came a whole visual culture expressing itself through flyers, video clips, Vjing, fashion, posters, record and CD covers. Compared to some of the work which was designed during that period even Carson's designs might look somewhat restrained. The graphic designer of the early Techno days would run images and text through ever more bizarre Photoshop filters (figure 35). And while Photoshop offers quite a few of these, new filter collections such as EyeCandy were developed because the results could never be bizarre enough. KPT or Kai's Power Tools, a competitor software to Photoshop, was actually more or less designed around the idea of easier application of filters. Other popular toys were the up and coming 3-D software packages which were instantly abused for typesetting purposes and further image distortion.

This is not to say that those experiments were totally unnecessary. With hindsight though, one might find an element of hysteria in these designs. Techno was highly fuelled by drugs (Huber, 1995), much like the hippie culture which similarly produced very colourful and psychedelic artwork in the 1960s and 70s. But, as ever so often with drugs, after the party follows the hangover. If one now looks at contemporary visual culture, one will have a hard time trying to find such excessive use of image and text distortion. When it comes to photography, for example, there is a trend to a form of hyper-reality in which reality is very subtly transformed or undermined, like in the work of Andreas Gursky (Figure 36), which is a more realistic approximation to the effect that digital technology actually has on society. Similarly, in print and on the Web, Swiss style has its renaissance, of which the success of a movie about the typeface Helvetica (2007) is one of many indications. Wyatt (2000) back in 2000, sensed 'a period of restraint' in the late 1990s graphic design. Human sensuality shifts between the contrasts of simplicity and abundance. It is not a simple black and white choice nor is there a straight line from simplicity to ever bigger complexity as hypertext theory implies. Fashions, like a pendulum, swing back and forth. And while certain extremes help to extend the visual vocabulary, at some point patterns have to appear from chaos. This refers back to the idea of human communication and particularly language as dynamic systems. Dynamic systems are organized on the basis of a landscape of attractors and constraints (Kauffman, 1995, pp. 161): the flooding of a whole area might leave behind a new anabranch and thus, change the landscape, but

constant flooding simply makes the landscape uninhabitable. Total freedom of form of expression is the death of communication. It simply produces too much entropy. While distinct patterns cannot guarantee understanding, they can at least assure that so much as a communication takes place.

When accused that his work does not communicate, Carson tends to refer to the aphorism 'one cannot not communicate' (Blackwell, 2000). As true as this is, the question remains, whether Carson's approach towards visual communication reflects the current reality of digital networks. To the contrary, it will be demonstrated in the following that the Web is undergoing a period of visual restraint. The whole idea of the graphic designer taking control of the Web in order to fulfil Carsoneske visions of a visually rich text-image emulsion is misguiding. It will become clear that such visions are based on misunderstandings of both the technological foundations of the Web as well as the role of the designer in this context.

5.5 The Web is Writing

David Carson (Blackwell, 2000) describes himself as an artist. Artistic freedom is not only a question of creativity but also a question of control over the artistic product, which is authorship. Despite the fact that he most likely responds to a client brief, on the technical side, the print designer is in full command of the output of his work. In the pre-digital era of print, the layout was a very physical process. Either it was achieved via illustration or via manipulation of objects on a surface such as letterpress types or rub-ons[105]. Thus, the designer was either a *painter* or a *collage-artist*. The GUI made it possible to transfer such an approach as it allowed the designer to produce layouts on his *desktop* with toolbars containing *pencils*, *cutting blades, scissors* and other design tools he was familiar with in the physical world. Through desktop publishing, the processes of layout and print pre-production were actually merged into one and thus, digital media increased the amount of control the designer has over the printing process. And for the first time in the history of print the pre-production of text and image were also merged (Kirschenbaum, 2003). The designer does not have to rely on a type-setter any longer and less and less on a retouch artist or a reproduction studio. The important question in this context is whether this amount of control

[105] Before desktop publishing on the computer became the rule, adhesive rub-on letters where often used in order to layout headlines or even dummy text.

ıre 37: In 1993, *Xplora* by Peter Gabriel was one of the first artistic CD-ROMS that made a big impact. Its style resem- a combination of TV and print graphics. Authoring tools for CD-ROMs such as Director gave the designer full control r the layout just like in print but with the added features of movement and advanced interactivity.
age source: screenshot from Gabriel, 1993)

does extend to the design of screen-based digital media? The first experience with designing for the screen for many designers in the late 1980s and early 90s seemed to confirm to such an assumption. Up to then the Internet was still a niche domain for scientists and a few other insiders. The graphic designer's contact with digital media was most likely through Macromedia Director or other authoring tools for CD-ROMs and similar stand-alone applications. These software packages gave the designer full control over the layout and for a short time the CD-ROM turned into an art form in its own right with designers and artists developing sophisticated work such as Peter Gabriel with his CD-ROMs Xplora (figure 37) and Eve, skilfully combining text, image, sound and video to create complex multimedia experiences.

The problem though is that tools like Director were developed with the graphic designer in mind while the Web was not. Berners-Lee, the inventor of the Web, and his community, were scientists who would publish the output of their research in written documents. Thus, HTML when it was developed in the 1980s ('HTML', Encyclopedia Britannica [online]) was a tool for coders and researchers to hyperlink and format or *mark up* their own text. Just in the spirit of Bush's Memex, it was a tool for scientific writers, a way to pass on text-based knowledge. The content provider, or the writer to be more precise, was the same person as the coder and the designer. The graphic designer was not part of the original equation.

And until today the layout of text and images on websites is rendered via HTML[106] or XHTML[107] which, technically speaking, is not a programming language (Korpela, 2000) but is referred to as a formatting language (*H*yper*T*ext *M*arkup *L*anguage) that defines how a specific set of data is displayed. In order to format a specific part of a text, this text is framed by so called tags which tell the browser how to display. The following HTML code:

'This text is bold while the rest of the text remains normal'

... will be displayed in a browser as follows:

This text is bold while the rest of the text remains normal

[106] Meanwhile, CSS (Cascading Style Sheets) has become the standard for applying layout properties to text elements and images. However, the browser still outputs HTML code.

[107] In 2000, the W3C (World Wide Web Consortium) has recommended XHMTL (Extended Hypertext Markup Language) as the new standard. HTML 4 was supposed to be the last version of HTML but meanwhile the WC3 (2007) is relaunching its activities with respect to HTML (W3C, 2007).

The initial tag () defines the beginning of the bold formatting while the same tag with a slash in front () defines the end of the bold formatting. The markup language simply follows the flow of a written text, from the top left to the bottom right. HTML is a markup language for alphanumeric text, organised around text. Thus, Glazier (2002, p. 78) has every right to claim 'it is important to emphasize that, principally, the Web is writing. It is presented as a series of pages that are written.' Any images or movies are external sources which are referenced to and called by a specific source (src) tag so that in the Hypertext source code any rich media format appears basically as a text. A very simplified reference to an image would look like this:

```
<img src="Axel.jpg"/>
```

The idea of formatting a text is quite different to the layout of text in two-dimensional space. Rather than arranging visual elements on a plane, the designer has to write his layout in form of a text and to make it even worse, he has limited control on the display of what he designs. He can never be sure whether what he designs and what the reader sees are the same. In print, the designer arranges the text as objects on a physical surface and refers to measures in absolute terms. Once the design of a paper-based document is decided its looks remain fixed and every print should be identical. Websites, on the other hand, are based on the idea that the code is located on one computer, the so called server, and sent to whatever client machine accesses a specific site. The way the page is rendered in the client, the 'text-as-seen' (Bootz, p. 107) can never be fully predicted (ibid).

First of all, this is because the client constellation with regards to software, hardware and the interplay of both can never be foreseen. Another reason is that the platform for a digital-borne text is the screen and the way text displays on it is very flexible. While the paper borders define the designer's canvas, the Web does not have proper borders. A single page of a website might contain a lot of content only available via the scroll bar. This means that the page, as such, can never be seen as a whole and each little shift in the scrolling position changes the visible pane. The horizontal extension of the display is similarly undetermined as different computers have different screens with different size and resolution. The concept of windows is actually a way to multiply the screen but because windows can be manually resized there is even more uncertainty as to the presentation format in which the digital text appears. Typograph-

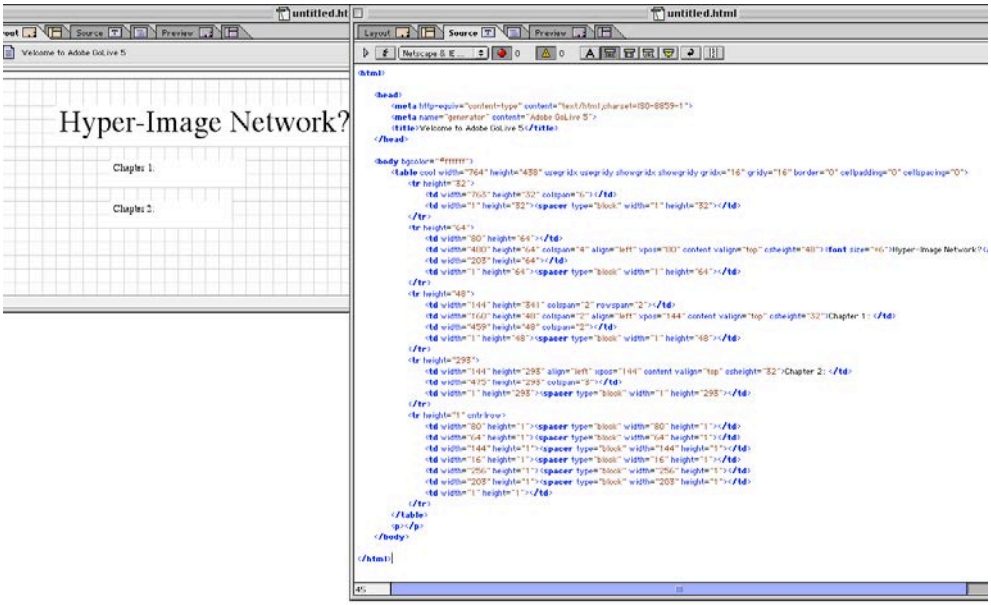
ic fonts are another domain where the designer has lost control. They are neither part of the code of a website nor are they located on the server which holds the code of the site. The website has to draw from fonts that are residing on the client machine. Thus, to be on the safe side, the formatting would better have to include only fonts which come preinstalled with any operating system. By November 2006 there were less than twenty fonts (+ their bold equivalents) which would cover both Windows and Mac OSX (Perez, 2006). Also, the user is empowered to zoom in and out on any page. Accordingly, a lot of the HTML encoding was, and still is relative. Headlines, for example, can be defined with tags from <h1>...</h1> to <h6>...</h6> displaying 'the size of the headings in relation to their importance, with h1 being the largest and h6 the smallest' (Lemay, 2003, p. 652). Not only does the designer have a very small choice of type, he cannot even be sure how it performs on the screen.

All these restrictions made it rather difficult if not impossible, specifically in the early days, to position any design elements exactly on a website, as this was not the intention in the first place. It has to be stressed that HTML is not so much about arranging text on a two-dimensional plane of a specific, clearly defined size than about formatting specific text elements with a limited control over the way it is rendered. But giving up control over their output is simply not the way graphic designers are used to work:

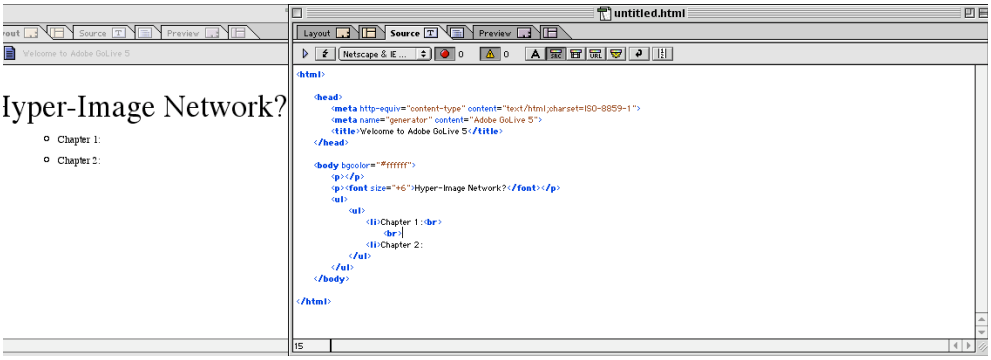
> Graphic designers, however, have insisted on controlling the horizontal placement of images and texts, not just the vertical flow. They have exploited the HTML tags available and campaigned for new tags, and indeed whole new formats, in order to obtain that control. (Siegel cited in Bolter, 2001, p. 69)

Besides having a say in the extension of standards, there are other ways in which designers tried to gain control. While programmers would *write* their code on a CLI, designers would soon *design* their websites on a WYSIWYG[108] Web editor. Golive and Dreamweaver were among the first tools to leave an impact on the graphic design community. Both offered a specific design view which allowed the designer to place

[108] 'Pronounced *WIZ-zee-wig*. Short for ***w**hat **y**ou **s**ee **i**s **w**hat **y**ou **g**et*. A WYSIWYG application is one that enables you to see on the display screen exactly what will appear when the document is printed. This differs, for example, from word processors that are incapable of displaying different fonts and graphics on the display screen even though the formatting codes have been inserted into the file.' ('WYSIWYG', <http://www.webopedia.com/>)



ıre 38: Above an example of a website designed via a design-grid with *GoLive*. The designer simply drags and drops -fields and images onto a grid (left). The advantage is that he does not need to know anything about HTML but the ɔmatically generated code (right) is rather extensive. (Image source: screenshots from the GoLive application)



ıre 39: A similar website written without a design grid (left). This approach asks for some coding knowledge but as a ılt it produces much leaner code (right). (Image source: screenshots from the *GoLive* application)

text and pictures freely onto a page where they were locked into a grid. The problem is that a layout produced in this way might look okay once rendered in the browser but the code, which is generated from the layout is most likely to be bloated with unforeseeable consequences for the performance (figures 38 and 39). Producing HTML with a WYSIWYG editor is possible but has never established itself as best practice.

5.6 Flash and the Web

As it stands, Web design is more about formatting a text rather than forming it. This means a total shift in the approach towards design. In print design, the two-dimensionality of the paper is the only real limit when it comes to designing and laying out a document. New digital media like the CD-Rom at first enriched the spectrum by enabling 3D (at least virtually) and 4D media. It seemed only natural that the newest medium, the Web that is, should offer similar control over the layout. When, in December 1996, Macromedia's Flash software arrived on the scene, it appeared that the designer's needs had been served. Flash is a vector based 'authoring environment for creating rich, interactive content for digital, web, and mobile platforms' (Adobe, 2007). It promised to give the designer the similar freedom with regards to Web design as an authoring environment for stand-alone applications such as Director. In 1997, the website Gabocorp[109] caused a stir among the design community. It was one of the first, if not the first website, that extensively used the features of Flash: Words and buttons were twirling and flying around on the page with background-noises that seemed to come directly from the android factory. The site boisterously claimed: 'You are about to enter a new era in website design. This is the new standard for all things to come'[110] (figure 40). Multimedia and total layout control appeared to have finally arrived on the Web.

[109] Originally the page was available at <http://www.gabocorp.com>. Meanwhile though, this address contains different content. The original Gabocorp Flash site is currently archived at <http://www.thefwa.com/flash10/gabo.html>

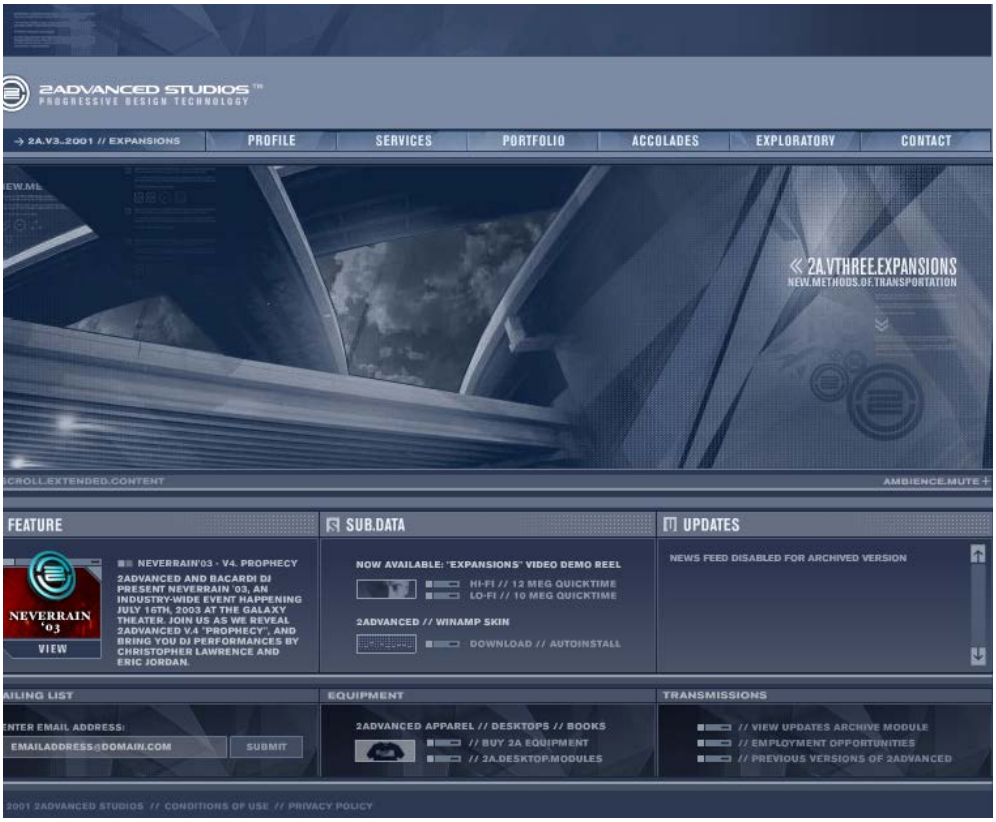
[110] One of the author's students (Mitsopoulus, A., email, 24 November 2006, antonis@plan9plan.com) told in an email that he was quite frightened by the challenge this site presented at the time. He wrote: 'I remember back in those years, the most eccentric use of Flash you could see was just a simple motion tween and suddenly Gabocorp came up to shock! I remember myself being scared by the thought: "what am I going to do if they ask me to do this?"'

ıre 40: In 1997 *Cabocorp* was one of the first, if not the first website excessively utilizing the powers of Flash as a tool for -based animation. The navigation (middle and right) was organized in a so called revolver menu, where the single navi-on items on touch would impressively revolve around the centre of the page, each movement underlined by similarly ressive sound effects. It seemed that the times of restrictive HTML were over and that the Web was finally prepared for moving graphics. (Image source: screenshot from <http://www.thefwa.com/flash10/gabo.html>)

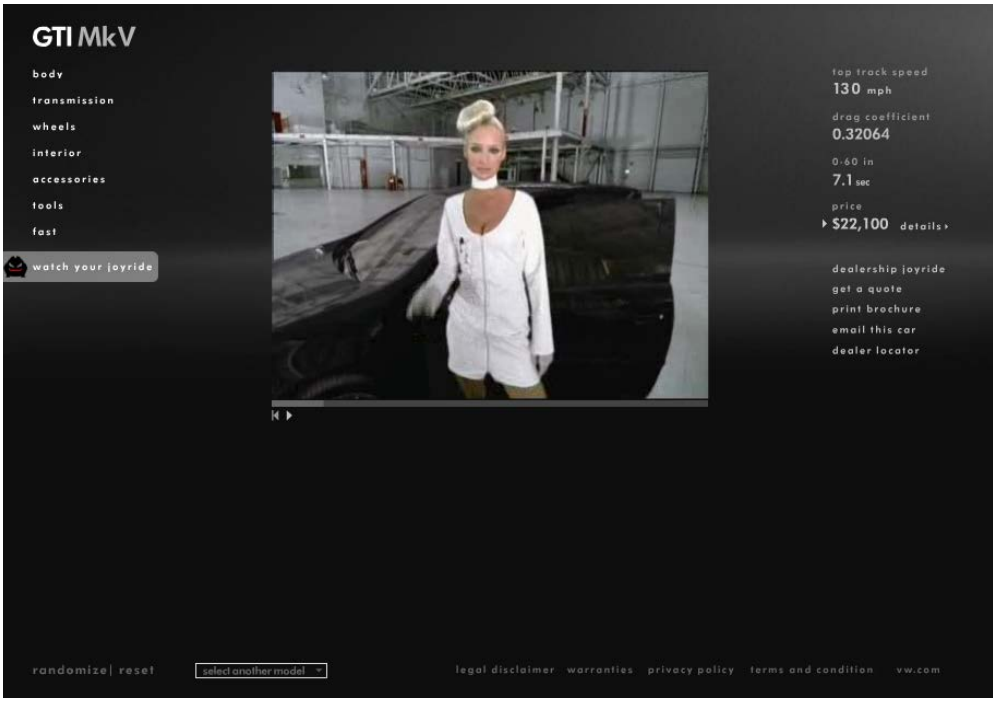
The mood soon changed. In October 2000, Jacob Nielsen (2000a), a well-established and outspoken Web usability expert posted an article named 'Flash: 99% Bad' on his infamous useit.com alertbox. What had infuriated Nielsen so much about Flash? The problem with Flash in the early years was, and to some extent it still is, that it defies the textual nature of the Internet. While HTML formatted sites basically produce a network of interconnected texts according to Bush's vision, a Flash file is based on the metaphor of a movie. Authoring a Flash site, the designer freely positions all elements such as texts, images, graphics and movies on a stage. At the same time he places them on a timeline which decides on when specific elements and interactions are accessible. Once the site is authored the whole site is exported into a movie which contains all the elements and the interactivity, thus, guaranteeing absolute control over the looks and feel of the Flash content. In that process, all letters are turned into graphics which as it seems pushes the Web one step closer to pictorial writing.

There are some severe consequences though as this approach goes against the grain of everything which defines the HTML-based Internet: Early Flash websites 'integrated poorly with search' (Nielsen, 2000a). When text is turned into graphics, there is no text for search engines to index. There is no way to find a specific word in the text of a Flash site via the browser *find* function either (ibid). It also means trouble for visually impaired people who are reliant on text-to-speech technology which reads out loud any texts on the site including navigation (ibid). Similarly problematic is that Flash movies ignore the browser functionality for increasing and decreasing the text size. Another point is that web pages are addressed individually via different URLs. If the content of several pages is contained in one movie, as it is with Flash, this is not possible and the back and forth buttons of the browser do not work any longer (ibid) and, as a logical consequence, bookmarking of individual sub-pages is not possible. Also, Flash pages simply do not print (Goldman, 2006). Another point relates to the proprietary set up of Flash: while HTML pages can be edited in editors available as cheap shareware or even as freeware, Flash can only be edited with the rather expensive Flash authoring environment from Macromedia[111]. This, in combination with the fact that the editing of Flash is less straightforward than HTML, makes it most likely that Flash websites will be updated less regularly (Nielsen, 2000a). And, last but not least, designers often simply succumb to the temptation of rich media offered by Flash,

[111] Macromedia has meanwhile been bought by Adobe.



ıre 41: The website of *2Advanced Studios* was chosen the most influential Flash-based website by the users of The Fa-te Website Awards. It clearly shows one of the main strengths of Flash: building impressive stand-alone environments concentrate on high visual impact. (Image source: screenshot from <http://v3.2a-archive.com/>)



ıre 42: The 2007 *GTI* promotion allowing the user to individually build his dream-car and then go for a virtual test-drive ı' Miss Helga' on the passenger seat. Like with the 2Advanced Studio site (figure 42), Flash is used to produce a video-ıe like immediate experience where data interchange is of less importance. (Image source: screenshot from tp://www.iqinteractive.com/vwgti>)

when a more down-to-earth and content centred approach might be more appropriate (ibid)[112].

Nielsen's arguments were, and still are, heavily circulated and discussed in the Internet as a Google search for 'Flash' in combination with the word 'bad' shows. Macromedia took on board the advice of Nielsen, even working together with him in order to get it right. Since then some of the mentioned issues seemed to have been addressed in several new releases of the Flash authoring tool. Nielsen's consultancy, the Nielsen Norman Group, offers almost two hundred pages of Flash usability guidelines (Nielsen Norman Group) and other publications, such as 'Flash 99% good' (Airgid & Reindel, 2002) give advice on how to make Flash websites compliant to web standards. But the amount of text available which explains how to make Flash compliant to web standards is just another reflection of the problem. Goldman (2006)[113] argues that the solutions offered are mainly workarounds, often 'frowned on' for their complexity, badly implemented or not implemented at all (ibid). A good example is the way Flash offers search engines access to the data contained. Goldman (ibid) rightly states that a page not listed in Google 'is like disappearing from the web'. Flash sites can have 'a so-called *doorway*[114] page that delivers an alternate text version of your site ..., but then you're just paying more to build a Flash version and the HTML version you should have built in the first place' (ibid). Generally, in order to comply with the inherent structure of the web, extra work has to be invested in Flash-based sites while any simple HTML is part of that structure and all those features come for free.

In 2006, on the occasion of the 10th anniversary of the release of Flash, FWA.com, together with Adobe held a competition for the 'most influential Flash site of the decade' (FWA, 2006). The overall winner voted for by the majority of the more than fifty thousand voters was the site of *2 Advanced Studios* (figure 41). This is significant in so far as this site is much more reminiscent of a computer game than anything else and thus, it shows very clearly where the strengths of Flash as a technology lie. Flash is quite heavily used by companies selling high-end products, helping to communicate these products in a very emotional involving and game-like mix of video and

[112] There are other issues less relevant for this thesis such as the rather high bandwidth required by many Flash movies which can cause problems for people in less developed countries or the fact that archiving and keeping Flash files available over the years proves extremely difficult (Entlich, 2004)

[113] His arguments are based on the Flash version 8, the last but one release of the Flash authoring environment. In spring 2007, Flash CS3 was released. As the basic structure of Flash has not changed, it is to assume that Goldman's arguments are still valid.

[114] According to Boswell (2005) doorway pages 'are simple HTML pages that are customized to a few particular keywords or phrases, and they are programmed to be visible only by specific search engines and their spiders'.

interaction, one of the latest and very successful examples being the *Volkswagen GTI promotion*[115] (figure 42). Videos and games can produce immediacy and high involvement even more than images. But such productions are a supplement rather than a substitution of text not at least because they are extremely expensive to produce. Sites that are heavily based on Flash are actually independent multimedia applications inside of the Web, only loosely connected to it via their URL and their meta information but often not via their content – unless the content is additionally pushed via a doorway page.

This is not to say that Flash is useless but one must consider exactly in what context it makes sense. As Goldman (2006) says 'building entire websites in it is a horrible idea' but for data visualisation, games and specific interactive features on commercial sites, such as choosing tickets and seats on a theatre website, Flash is the right tool. The inclusion of streaming video made it a serious player in that segment as well (Frommer, 2006). But while the website *built with* (2007) claims that Flash content can be found on 20.65% of the top 5000 websites, another source (Security Space, 2007), based on 271,841 websites, has found only 12.50% penetration over all. This figure is probably still a huge distortion of reality because using Flash as part of a website does not mean that every page features Flash content. Sony.com, for example, uses its start page as a multimedia hub from which it links to many sub-pages, of which many do not contain Flash at all. Macromedia's original 'strategy of getting multimedia graphics on most Web pages' (Coale, 1997) failed. Flash though, is undeniably an important Internet technology. It is often used very selectively to highlight specific content. It is more likely for individual Flash movies to be embedded into an HTML site than for the whole content of a site to be embedded in a Flash movie because of the before mentioned severe restrictions the latter causes. And accordingly, Adobe is pushing Flash more towards 'a general-purpose application development platform, one that focuses on video delivery, applications for mobile devices and web applications running outside the browser'. (LaMonica, 2006) This homes in on the point that Flash is probably most effective when it is applied as a stand-alone solution, taken out of the textual data flow of the Web.

[115] The Volkswagen website does not contain this promotion any longer. It has been archived on the website of IQ Interactive, the agency which produced these interactive adverts. However, searching Google for the terms 'IQ interactive' and 'GTI' does not bring up a link with the actual promotion, at least not among the first fifty hits. This goes to show how a very successful digital media design agency has sealed off its content from the rest of the Web by solely relying on Flash technology – a rather absurd situation.

The Web still is a huge interconnected text. It is a form of writing where the content rules over visual expressiveness which seems a difficult lesson to learn for those designers to whom visual expression is everything. Flash enables the control of the look and feel but is paid for with separation from the Web. On this note it might be interesting that meanwhile Gabo has turned his Gabocorp.com into a very subtle blog about web design – mainly text-based (figure 43).

5.7 Text and Image on the Web

Flash allows the designer to fully control the visual output of alphabetic text on the Web, in that it bypasses HTML with a different format. This strategy is nothing new. In the early days of the Web, designers realised that they could elude the crude typographic and formatting options of HTML by turning text into image formats such as jpg or gif. David Siegel belongs to the first generation of graphic designers moving into Web design. His successful book *Creating Killer Web Sites: The Art of Third-Generation Site Design* (1996) is, to some extent, a collection of hacks for graphic designers who have problems dealing with the formatting restrictions of HTML. His aim is 'to make the Web more visually rewarding' and for him design skills are the driving factor in the construction of websites rather than technological competence (ibid, p. 29).

Bolter (2001, p. 69) refers to Siegel's book when he acknowledges that 'websites started to look like magazine advertisements, with striking visual metaphors, display fonts, drop-shadowed texts, colour gradients, and the pixel-by-pixel construction of gridded spaces'. And both Bolter and Siegel are convinced that this is the way ahead. With his choice of examples, Glazier similarly sells the vision of a digital world dominated by graphics and graphic designers. Glazier shows the website of the White House as it presented itself in 1997 (figure 44). He admits (2002, p. 86) that his example might seem primitive but insists that 1996 and 1997 were a 'period crucial in the development of Web conventions' (ibid). His example definitely supports the case of an image dominated web with a picture of the White House in the middle and all text links organised around it as iconized buttons. In the same way, Bolter's choice gives the impression of a medium organised around images if not one where text and image merge. He (2001, p. 73) explains the 'splash screen for a multimedia presentation on

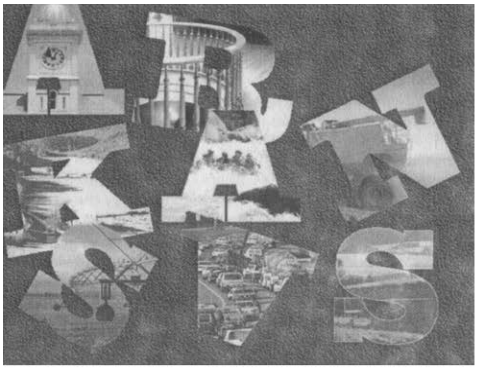
ıre 45: The homepage of the *White House* in 2007. Content, mainly text, rather than representation has taken the prec-
ıce. The site appears in many ways like a professional news platform. In comparison, the screenshot from the same
ıain ten years earlier (figure 44) now looks rather crude if not tacky. (Image source: screenshot from
tp://www.whitehouse.gov>)

Arkansas' (figure 44, left side) as an example for a 'buttoned style [which] is about writing with Images rather than words'. (ibid, p. 72) According to Bolter (ibid), it is actually a sign of failure if the designer has to fall back on text:

> In the buttoned style, to place more than a sentence or two of text on a screen is an admission of failure, for the assumption is that the designer should be able to deploy a graphic, a video, or perhaps an audio segment to communicate any idea she has. A paragraph of prose is a last resort — to be used when she runs out of ideas, time, or production resources.

Looking at today's Web, Bolter, Glazier and Siegel might be quite disappointed. The White House website is now dominated by text-based content (figure 45) rather than by a tacky graphic metaphor expressed through fancy adornments such as golden door plates or icons of lecterns. There is obviously no way the site of 1997 has set any standards with regards to web conventions as Glazier (2002, p. 68) wants to believe. A similar case presents itself if one compares Bolter's example for the 'buttoned style' with the current official website of the State of Arkansas (figure 46, right side). This site (<http://www.arkansas.gov>) nowadays presents itself dominated by text as well. And, like the White House website, this page is not only very economic with regards to the usage of imagery but also generally very contained. These two examples illustrate that theories of image writing on the Web have simply been dazzled by wishful thinking and early day print-cum-web designers like Siegel who tried to force their notions of print design onto the Web. The backlash is apparent. It is clear to see now that very often these designers were actually still very much thinking in terms of print design. They lacked a deeper understanding of the medium. Siegel (1996, p. 21), back then, admits that this is in fact the response which he received but he laughed it off as he was sure that visual richness was what people wanted to see on the Web in the first place (ibid).

Technically, the practice of early day web designers to turn text into images does have the same effect which Flash has. It deprives the text of its properties as an alphanumeric sign. The image-turned-text becomes a blind spot for search engines and data bases. It is fair to say that such a text turns into a ghost, visible to the human eye but non-existent in the context of the Web. Kirschenbaum (2003, p. 138) rightly observes that 'as computational data structures, images differ radically and fundamentally from



ıre 46: To the right the homepage of the state of Arkansas in 2007. It is quite far from the image dominated splash page : Bolter presents as an example of image writing (left). (Image sources: Bolter 2001, p. 73 and screenshot from tp://www.arkansas.gov>)

electronic text' and that this is often overlooked by those who subscribe to 'the truism that the boundaries between word and image have never been more permeable than they are now'. Siegel and his followers were still thinking in terms of print design where technically there is no fundamental difference between text and image. For them, a website was a clearly defined space that could be designed in its own rights. It was just like organizing text and image on a piece of paper with added interactivity.

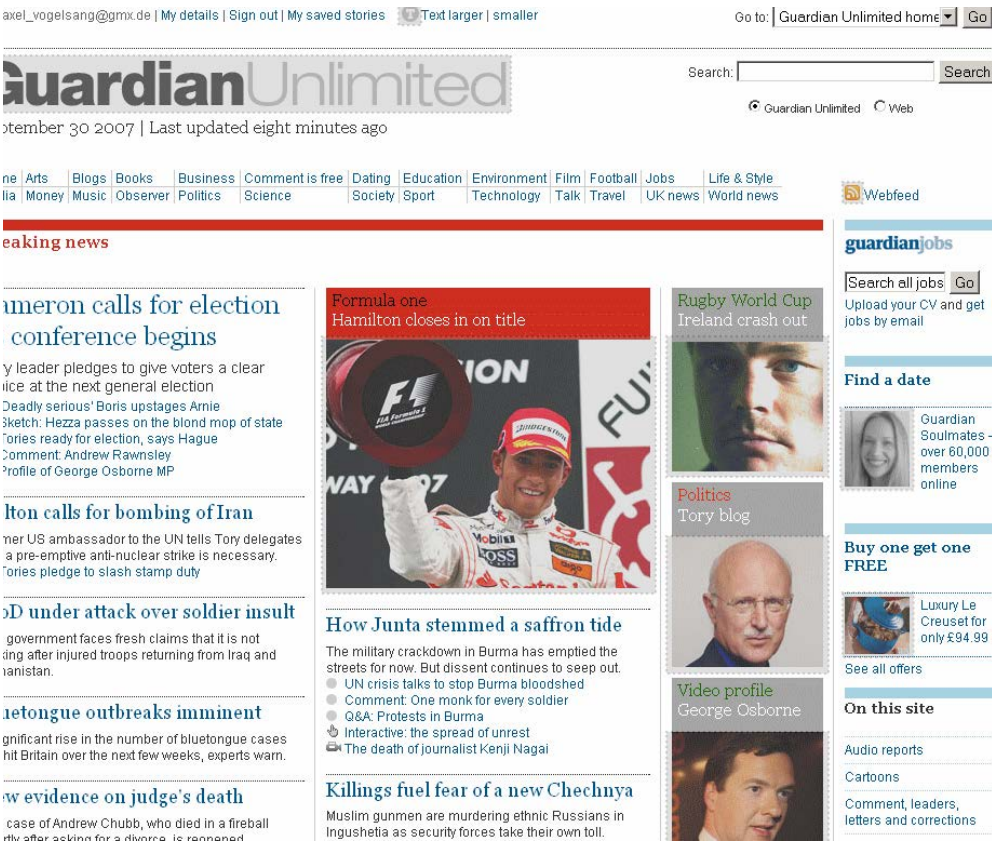
Another example which illustrates that the awareness for such issues has grown and that the attitude towards text and image in Web design has radically changed over the last ten years is the website of the Guardian newspaper[116]. The Guardian is a very design aware company. Its newspaper layout by Neville Brody has won several prices over recent years (Busfeld & Jones, 2006). What Carson was for the late 1990s, Brody was for the 1980s and early 1990s. At that time he was one of the most influential figures in graphic design and he similarly pushed the boundaries of typography (Wozencraft, 1994). Brody though, underwent a transition from being a specialist designer for cutting edge fashion and music publishing to becoming a high end information designer, responsible for the editorial design of the Guardian and the Times as well as for the information system of the Art and Exhibition Hall of the Federal Republic of Germany in Bonn. The Guardian also entrusted Neville Brody's studio with the design of their first serious web presence in 1999. During 1999 to 2001 the Guardian Website slightly changed its face three times and from then on stayed more or less the same until summer 2007. The site starts off in 1999 with a very image heavy layout (figure 47, top)[117]. All the headlines, and even the main navigation, had been turned into graphics. In the following years, the design underwent several changes, until it settled into a more stable version in 2001 (figure 47, bottom). During this process some of the early design decisions were revised but nevertheless, the site still contained quite a high amount of text transferred into image formats.

The relaunch of the homepage in summer 2007[118] (figure 48) saw a radical shift of approach. Now, all texts, except the Guardian Unlimited logo and the logo for

116 <http://www.guardian.co.uk>

117 The old versions of the Guardian Unlimited website are stored in the Internet Archive under <http://web.archive.org/web/*/www.guardian.co.uk>

118 Currently (Spring 2007) the new layout only concerns the front page. All other pages still run with the layout from 2001.



ıre 48: By autumn 2007 *the Guardian* home page got rid of most image-turned-text. The Guardian logo, one of the few s still in a graphic format is reduced in size and the general text-image ratio has changed in favor of text. There is also a clear visual separation between text and image (all image formats are marked with a grey overlay and a dotted outline). age source: screenshot from <http://www.guardian.co.uk/>)

Guardianjobs, are displayed as ASCII[119] characters instead of being embedded in image formats such as jpg or gif. There is generally a very clear and conscious visual separation between text and image. By clearly drawing the line between the written word and the picture, the Guardian Unlimited does not only adjust itself to best practice of web development. It actually returns to a visual face that stands for the origin of the Guardian as a critical newspaper. If it is the task of the text to criticize the image, as Flusser (2003) assumes, then, the conflation of both, annihilates this distance. It is not a mere accident that particularly the tabloids, known for their unconsidered approach towards news, tend to obliterate the border between the text and image. The clear separation of those two media though, as practiced in the current Guardian website, is a statement that puts text and image into their place. This is to show that image writing or the merger of typography and image, whilst a phenomena of the early years of the Web, is actually a relic of the age of late print. Print designers like Siegel were simply transferring what they were doing on the paper onto the digital screen. For them, the structural difference of text and image in the context of the Web was only interesting in that it was seen as a problem which had to be overcome.

It would be unrealistic though, to deny that the Web does not include more and more rich media. Amongst others, platforms like Flickr, YouTube and MySpace, have turned the Web into a huge repository for images as well as movies and audio files. But this does not stand in contrast to a Web organised around text, because the taxonomies through which those data are defined and made accessible are text-based, as a simple look at the navigation of those sites shows. It also does not mean that designers should not experiment with text or with combinations of text and image. The question though is, whether some print graphic designer's fixation on visual expressiveness has the same relevance for the Web as it does for printed matter. Creativity and design for the Web, as argued in the following, are more than just about the arrangement of visual elements on a surface.

[119] 'Abbreviation of *American Standard Code For Information Interchange*, a standard data-transmission code that is used by smaller and less-powerful computers to represent both textual data (letters, numbers, and punctuation marks) and noninput-device commands (control characters). Like other coding systems, it converts information into standardized digital formats that allow computers to communicate with each other and to efficiently process and store data.' ('ASCII', Encyclopedia Britannica, [online])

5.8 Web 2.0 and the Free Flow of Data

Susan Sontag (1979, p. 241) once noted, 'that most logical of nineteenth-century aesthetes, Mallarme, said that everything in the world exists in order to end in a book. Today everything exists to end in a photograph'. McLuhan (1964, p. 59) referred to the same quote when he said that 'we are now in a position to go beyond that and to transfer the entire show to the memory of a computer'. By now, this statement would have to be redefined inasmuch as everything exists to end in a database. This is one of the fundamental principles of the Web and it has consequences for the design. While in the early days many pages were hard-coded in HTML, nowadays most pages are dynamic. The content resides in a database and the site is rendered in the moment of access. The actions of the user trigger specific content to be drawn from the database which is then rendered in the client browser according to the layout information given by the style sheet. Thus, the notion of a website becomes even more fluid than it was before. And not only does the designer have to struggle with the fact that there is no clear physical or even visual border of the single site but actually the borders between websites themselves start to blur. Content flows in between databases from one site to the next. This process is called syndication. Via feeds based on RSS[120] or Atom[121], any content can be made to flow from any site into any other site (figure 49). Websites and web communities are actually starting to overlap (Coates, 2003). Feeds also highlight the fundamental difference in the treatment of text and image on the Web. What flows through feeds is pure text. Image and moving image are simply integrated into the feed by referencing to the original source. The Web has turned into a fluid space with an immense scalability which works on the basis of the exchange of discrete symbols via code and text.

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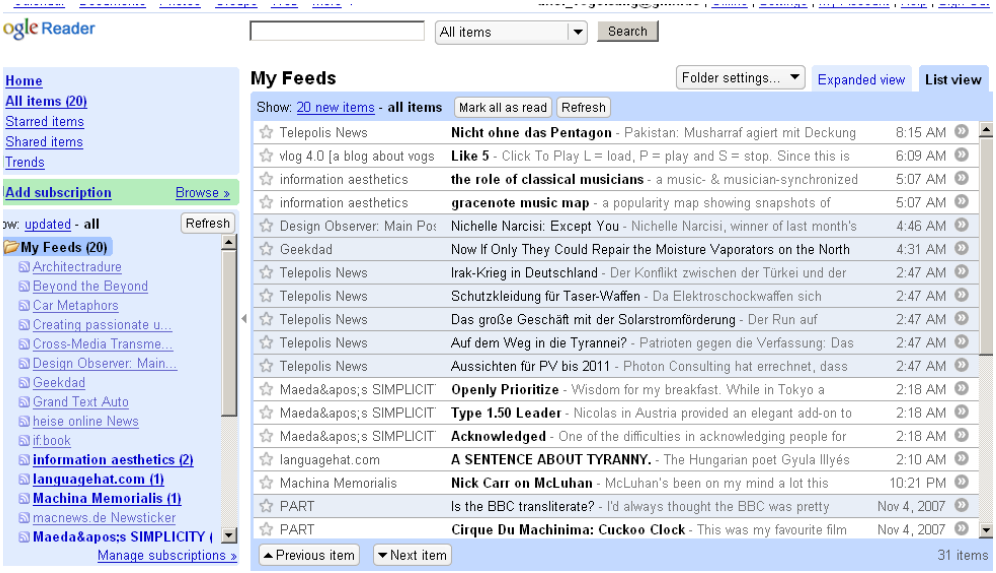
120 'RSS is an XML-based vocabulary that specifies a means of describing news or other Web content that is available for "feeding" (distribution or syndication) from an online publisher to Web users... A Web site that wants to "publish" some of its content, such as news headlines or stories, creates a description of the content and specifically where the content is on its site in the form of an RSS document. The publishing site then registers its RSS document with one of several existing directories of RSS publishers. A user with a Web browser or a special program that can read RSS-distributed content (an RSS aggregator or browser) can read periodically-provided distributions.' ('RSS', <http://www.whatis.com>)

121 'Atom is an XML-based file format used to syndicate content. Atom was designed to be a universal publishing standard for blogs and other Web sites where content is updated frequently. Users visiting a Web site with an Atom feed can discover a file described as "atom.xml" in the URL that can be copied and pasted into an aggregator to subscribe to the feed.' ('Atom', <http://www.whatis.com>)



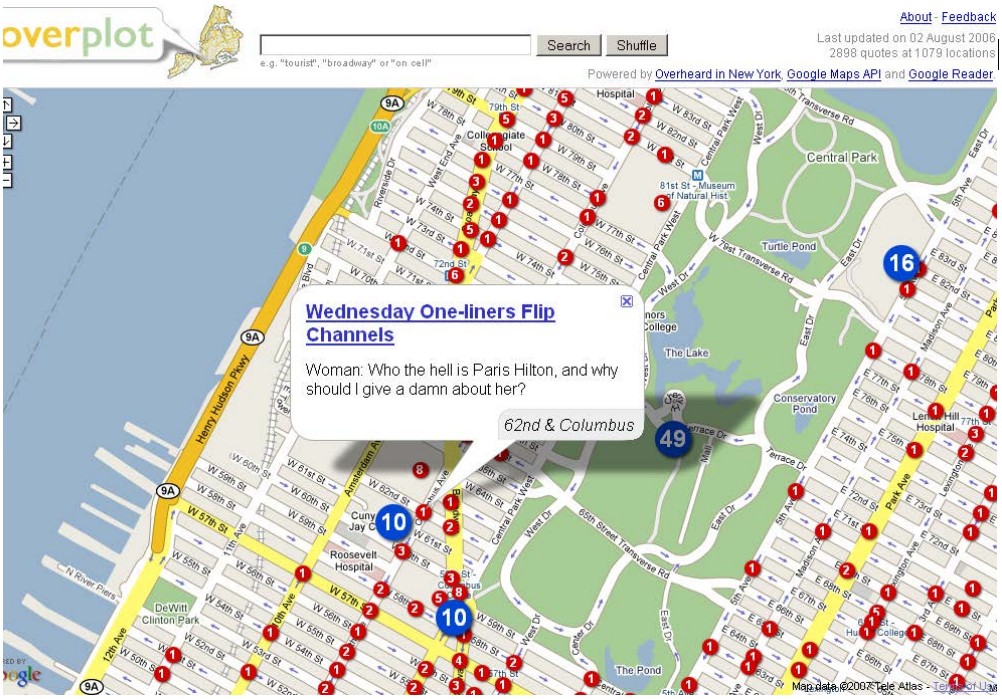
ıre 49: *GoogleReader* is an online newsfeed reader that allows the combination of any newsfeeds into a personalized 's portal. (Image source: screenshot from personal account at <http://www.google.com/reader/>)

But it goes even further than that. While feeds are a tool mainly used to propagate streams of information across platforms, a new phenomenon has taken off in the recent two or three years which is called mash-up[122]. Mash-ups are basically a way to take data from different sources and recombine them into totally new content. This mix is not restricted to text. Various kinds of media can be mashed up. *Overheard in New York* (<http://www.overheardinnewyork.com/>) is a platform where people post any kind of comical, whimsical or just strange conversations they have overheard in New York. Another website, *Overplot*, offers a mash-up, in which those one-liners and small conversations are mapped onto a street plan of New York (figure 50). Another interesting mash-up was produced by The United States Holocaust Museum in corporation with Google Earth in 2005. It is a project where pictures, events and testimonials are mapped onto the civil war stricken Darfur region in Africa via Google Earth's satellite photo map of the Earth (<http://www.ushmm.org/googleearth/>). It has to be said though, that even when text is mapped onto photographic or graphic material, this is by no means a proof that text is dissolving into a stream of images. It shows exactly the opposite. Streams of text are increasingly used to add layers of meaning to images which, if left on their own, can say everything and nothing. It is a vivid example of Flusser's notion of the text having to criticise the image, which in this case means that a semantic layer based on human language is added to the image.

Increasingly, companies such as Google and Yahoo offer so called APIs[123] which provide a window for users to access the databases of those companies and reuse the content for their own purpose as, for example, in the described mash-ups. This is another clear indication that there is a shift in how the Web is perceived. The Web is no longer about clearly defined entities in the form of individual sites but about enabling the flow of data. Not surprisingly, the big players nowadays are platforms like Google, E-bay, Amazon, Flickr, youTube, Facebook and the likes, who are in the trade of facilitating data flow. O'Reilly (2005) describes the search engine Google as an 'enabler or middleman between the user and his or her online experience'. This is not about pro-

[122] 'A mash-up is a Web page or application that integrates complementary elements from two or more sources.' (mash-up, <http://www.whatis.com>)

[123] '(*A*pplication *P*rogramming *I*nterface) A language and message format used by an application program to communicate with the operating system or some other control program such as a database management system (DBMS) or communications protocol. APIs are implemented by writing function calls in the program, which provide the linkage to the required subroutine for execution. Thus, an API implies that some program module is available in the computer to perform the operation or that it must be linked into the existing program to perform the tasks.' ('API', <http://www.pcmag.com/encyclopedia/>)



ure 50: *Overplot* is a so called mashup which combines different sets of data into a new application. In this case, it is a ıbination of oneliners and short conversations which people have overheard in the streets of New York combined with ɔgleMaps. So the map becomes an interface for navigating through overheard conversations. (Image source: screenshot n <http://persistent.info/overplot/>)

ducts in the first place, as the example of Amazon shows. While Amazon is selling products it allows other sellers to sell their books through Amazon as well. Through opening its platform for its own competitors, Amazon has turned into a synonym for everything related to books. On Amazon books are rated and discussed by readers who also share their reading lists. Additionally reading suggestions are provided, based on a user's earlier purchases and page views. Thus, Amazon is not simply a bookseller but a facilitator of reading.

In order to allow for such flexibility, the content of a website and its visual expression have to remain separate. This also explains why Flash, which attempts to merge content and visual output, is actually such a poor format when it comes to web design. Flash is a typical child of the early days, when companies tried to own the Web or parts of it through their own platforms. Netscape, one of the first generation graphic browsers, took such an approach:

> Netscape framed "the web as platform" in terms of the old software paradigm: their flagship product was the web browser, a desktop application, and their strategy was to use their dominance in the browser market to establish a market for high-priced server products. Control over standards for displaying content and applications in the browser would, in theory, give Netscape the kind of market power enjoyed by Microsoft in the PC market. (O'Reilly, 2005)

Netscape hoped to become the standard way of accessing the Internet and thus creating a dependency on its products, similar to Microsoft. Macromedia tried the same with Flash. But nowadays, content has to flow freely from here to there, platform independent. The approach of Flash is outdated in so many ways: it hardwires the content into the interface, it asks for a lot of expert knowledge to produce a website and it is expensive. This is exactly the opposite approach of some of the major developments the Web has seen in recent years. Today, the Web is about promoting free flow of content. Web design and design customisation are made as simple as possible and websites and content are handed out for free. The blogosphere, for instance, a term which describes the sphere of weblogs, counts about '75 million blogs' (Sifry, 2007). Most blogs are published via free online services or free software packages. The design can be easily chosen from several different templates, mostly designed by other users and then slightly adapted to individual need. And blogs are not simply a little sideshow. In its recent 'State of the Live Web' (ibid) report, the platform Technorati listed one blog

among the top twenty news media, nine among the top fifty and twenty three blogs among the top hundred news sources.

The increasing flexibility of data and the relative disconnectedness between content and visual representation makes the design of the interface arbitrary. Under such circumstances, iconic visual design, in the sense of a design that is strong enough and long-lasting enough to turn into an icon, becomes less and less probable. Indeed, there are still enough companies out there who will pay a lot of money for branding and excessive flash animations. But today, the real cutting edge is not so much concerned with how exactly things look but with how data flows in between sites and databases and how they are recombined. The emphasis on databases is also underlining the predominance of text. Mostly, databases do not contain anything other than text. Rich data formats such as video, images and movies are most likely to be stored outside the database. The database only contains references and textual descriptions of objects in these formats. This is because currently, text is the main material on which computers can perform any kind of semantic operations and comparisons in an efficient and successful manner and on a large scale.

5.9 Who is the Designer?

Neville Brody, back in the 1990ies, compares digital design with painting (Wozencraft, 1994, p. 6). Not only does this say a lot about the approach towards layouting digital data, it also rather idealises the work of the graphic designer. Most designers in their daily work never enjoy the artistic freedom which designers like Brody or Carson take for themselves. This applies to design for print as well as to design for digital media. Designers generally have to work under a lot of restrictions, not at least the client's brief. But whatever those restrictions are, the graphic design of printed matter is most often done single-handedly. It still has the aura of an individual creative act. This is much less the case with web design. Nowadays, the process of designing a complex Web application could involve at least four different professions which at some point of the process have a strong influence on how the information is displayed: the developer or programmer, the information architect, the usability engineer and the graphic designer. The borderlines between these professions are not always clear-cut. Graphic Designers, for example, often do information architecture (Morville & Rosenfeld, 2007, p.10) and graphic designers with programming skills are also increasingly com-

mon. Each of these job descriptions though, comes with a specific skill-set, which leads to a very specific viewpoint on the design of the interface.

The programming side, for instance, not only affects the performance of a system's backend. It also has an influence on the visual appearance. It was mentioned before that the interface of a digital device can theoretically be whatever one wants it to be. In reality though, standards have developed over the years for specific digital environments. On the Web, for example, those standards surround markup and coding languages such as HTML, XML, JavaScript, CSS, PHP. Standards are there to ensure compatibility and to make the job easier for the developers, so that they do not have to constantly reinvent the wheel. But obviously, standards do influence the way things are done on the programming side, having consequences on the display of the interface. Cascading Style Sheets (CSS), for instance, are a standardized way to format the display of HTML code. With CSS, text and images can be positioned on a site and lines and borders can be drawn around text and images. For the visual style of the borders there is a set of specific values, such as 'dotted', 'dashed', 'ridge', 'groove', which decide how the line exactly looks. Those values, in combination with other values for colour and width, allow for quite a variation of different border styles. But the variations are limited nevertheless, and in most cases, graphic designers will have to settle for the options provided by style sheets. Thus, the technology on the programming side defines the leeway for the designer. The influence of the code on the looks of a website can be even more dramatic in other circumstances. Content management platforms such as Drupal[124], Mambo[125] or Typo3[126] allow the building of very powerful database driven websites and even e-commerce systems with a ready-made toolbox approach. The site is built together from a core, plus additional ready-made modules, which can perform very sophisticated tasks. This allows for the assembly of highly complex interactive systems for an affordable price. A similar feat on a less sophisticated level is actually the case for blogging software such as Wordpress[127] or Textpattern[128]. All these packages though come with a predefined look and feel. This look and feel can be changed and adapted to the client's need. But the bigger the deviation from predefined templates, the more time and money has to be invested on the programming side in order to finetune the look and feel. Chances are that budget limitations

124 <http://drupal.org>
125 <http://mambo-foundation.org>
126 <http://typo3.org>
127 <http://wordpress.org>
128 <http://textpattern.com>

will have the core functionality rated as more important than time-intense adaptations of the looks.

These are just two of many ways in which programming and programming structures can affect the work of the designer and thus, become part of the visual expression. Just as the materials lead and paper had an influence on the medium letterpress printing, the structures of the code behind digital media influence their output. Accordingly, the person who manipulates structures and who maybe even decides on specific approaches towards programming is also partly responsible for the visual output. And even if the graphic designer has programming skills, this does not necessarily mean that his freedom as a designer grows. To the contrary, the knowledge of the code structures behind the visual display are most likely to influence the way he designs. In a commercial context the knowledge of how Cascading Style Sheets work, for example, will probably not instigate the designer to challenge those standards as this might blow the budget. It will rather make him aware of its possibilities as well as its shortcomings and force him to conform to the standards as close as possible.

But not only is design influenced by computational structure. Programming itself is increasingly seen as a creative act. Normally the people working on the programming side would either be called *programmers* or maybe upgraded to *developers*. On the other hand though, there is the expression of *software design*, describing the production of software as a creative process. And programming is not an exact science. Modern programming languages such as Java, Perl, C++ or PhP contain a lot of references to human language and leave a lot of leeway to the individual programmer. A solution to a problem can be expressed in various different ways in the same programming language to roughly the same result. A programmer might even be able to identify a specific style or handwriting in a code from members within his team. It is no wonder then that John Smith (2004, p. 46) talks about programming being a process of 'creative writing' and Fry (2004, p. 226) similarly, relates to programming as his 'creative outlet'. Thus, programmers discuss the 'aesthetics of code' and 'programming styles' (Cox, McLean & Ward, 2001). There is awareness among programmers of doing a creative job even though it is less outspoken for the 'fear of sounding presumptuous' as Fry (2004, p. 226) notes. But, while print designers are very much focused on the outcome of their artwork fixed in a two-dimensional display, programming is more about a process and the whole chain of events which makes an image or layout appear on the screen (Snibbe, 2004, p. 228).

Another member of the design team which can curb the visual designer's freedom is the usability engineer. For the literate person, print is very much a transparent interface. The ways of interacting with printed paper have not really changed since the invention of the printing press. Standards of usability had time to grow over the centuries. Human-computer interaction though, is a constant field of investigation and invention. Accordingly, computer interfaces can fail in that the interaction breaks down because the user does not understand how to interact or how his interactions affect the system. One example would be the metaphor breakdown in regards to the bin discussed in chapter four. As soon as the Web started to become a multimillion dollar business in the 1990s, interaction breakdowns were less and less acceptable which created a lot of opportunities for usability experts. The delicate issue in this respect is that usability engineering takes a scientific approach towards design. It records, measures and compares human reactions on specific interfaces and might even judge the success of a design by click-through-rates rather than by aesthetic values. While product designers and information designers are used to seeing their products as an object of utility, many graphic designers are not really familiar with such a notion. The functionalities of the medium paper have been established and learned over many centuries. The interface has become fully transparent. And so, for the print graphic designer, human factors are not a decisive element of the design process. In fact, the term of the user itself was heavily debated (Lovink, 2001). The discourse centred on two main aspects. Media theorists with a political background, such as Lovink, saw the growing relevance of usability engineering as a sign that the Internet was increasingly taken over by marketing and commerce. The art and design scene was more concerned with the fact their artistic freedom should be curbed by such issues as considering the audience (Vogelsang & Austin, 2004). No wonder that it came as a bit of a shock when usability expert Jacob Nielsen declared the 'end of web design' (2000b):

> The last five years, the Web has forced a severe focus on novice users. Basically, all Web users are novices all the time, since you very rarely use any individual website long enough to become an expert user.
>
> Even when some users return often enough to become skilled users, the site still needs to target novices in its design since people will not enter a website if it is not immediately obvious how to use it in a few seconds. *Zero learning time or die*. (ibid)

Nielsen realised that the vast diversity of interfaces was alienating the readers. Hitting a button, for instance, can lead to another page, play a sound, a movie or prompt a pop-up window. But, if the user does not know what interactions to expect, especially when it comes to complex business transactions, he gets caught up with the interface itself – a loss of transparency – and, according to Nielsen, turns away in frustration. Another issue was the increase in 'syndicated content that flows both in and out of' (ibid) websites asking for restrictions in the way this content is formatted in order to guarantee its free flow. The solution Nielsen offered in his *End of Web Design* article was to get rid of web design as such and provide for a more or less uniform interface. 'Expert features' could even be moved into the browser (ibid). For the user, 'the feeling should be that of remaining within a single smooth interaction' (ibid). Nielsen's vision of a uniform interface has not exactly materialised, but certain standards have been established. Many websites nowadays have their main content organised in one main column which is accompanied by one or two additional columns, with topical navigation and a header which often contains the top-level navigation (figure 55).

Ironically, the design of digital media because it offers virtually unlimited possibilities, has to be restricted and standardised in order to make for an effective reading, whereas the print interface is extremely transparent and the boundaries of visual expressiveness can be pushed accordingly. Slowly moving away from real-world metaphors, digital interaction has to produce its own set of standards, its own level of semantics based simply on the experience of digital media itself. Users, for example, have to develop a feel for what a link is in an environment where those hyperlinks are often not necessarily underlined any longer. The literacy of the audience will increase which then might open up more space for visual experimentation. But even then, as shown in chapter four, literacy is definitely helped by repeating patterns and not necessarily by constant innovation of new visual distractions.

Programming structures as well as human factors are not the only aspects to interfere with the work of the graphic designer. The flow of information itself has to be designed and the more complex the site and the interactions become, the less efficient it is to handle this solely via traditional graphic design layout methods. With elaborate user interactions, such as purchasing a product or adding a comment to an article, it is often more sensible to first look at the individual flow of the interaction without attempting to visually lay it out. Similarly, it is often important to take into account processes which are happening on the backend but are not visible to the user at all. Information architects use methods, such as *use cases* and *flowcharts* to predict and

design such interactions (Morville & Rosenfeld) and the reaction of the system. The visual output of such methods can be described as an abstract storyboard rather than a layout. Another outcome of the information architectural process is the so-called wireframe. It is a two-dimensional representation of the content and navigation to be displayed on the pages of the website (ibid, pp. 278). A wireframe is mostly done without images and graphics and a very reticent use of colour in order to prioritise specific content. It is often the first step towards a proper layout but at the same it makes for a very restrictive designer's brief. In the worst case it will turn the graphic design job into a branding and colouring exercise.

The environment, as it presents itself to the web designer, is much more complex than it used to be in print design and in the eyes of the print designer, this is a constraint of creative freedom. On the other hand, all these additional roles – information architect, usability expert and programmer – can theoretically be taken over by the graphic designer, and specifically with small-scale websites this is often the case. The graphic designer who has these additional skills will take on a lot more responsibility and will necessarily have to deal with many more issues than just two-dimensional layout. It will necessarily change the perspective he has on his job as a designer. He will not take the transparency of the interface for granted but, more like a product designer, he sees his outcome as a part of an embodied interaction. In this sense, the job of the web designer offers different ways of creative freedom than just visual expressiveness. In a domain where visual organisation is an important part of the process but not everything, pushing the boundaries does not necessarily have to result in visual excesses and the merger of image and text. Networked digital media are more interested in pushing the boundaries with regards to the way data flow and combine, in ways how semantics can be added to those data, and last but not least in new ways to involve opinions and the intelligence of individuals as well as communities, what O'Reilly (2005) calls the 'harnessing [of] collective intelligence'

5.10 Conclusion

Designers like David Siegel and Gabo wished to transform the Web into a domain which would allow print designers to apply their skills, enriched by moving image and various interactive features. Siegel (1996, p. 26) complained about the 'top-to-bottom, left-to-right sequence of text and images' of 'first generation websites' as well as about 'menu-driven' design (ibid, p. XV). Nowadays, extremely menu-rich sites are the rule

rather than the exception. The dominant reading direction is still top-to-bottom, left-to-right. Siegel (ibid, pp. 29) recommended what he calls entry-tunnels and what others would call splash pages: a front page which lures the user into the main site where the real content is. One of the examples pointed out positively by Siegel (ibid, p. 32) has an entry tunnel which asks 'Before we start, are you wearing clean underwear?' and offers a *yes* and a *no* button. It is most unlikely that today such a web presence would be presented as an example of excellence. Today, content-heavy front pages are the rule rather than the exception, and with hindsight it seems similar strange to show users the exit of a page as Siegel (ibid, pp. 32) suggests. This is probably the most striking example that many designers at that time simply did get it wrong.

It might be the case that in the mid 1990s this approach was what was needed to attract an audience that was mainly brought up with print and TV. Just like the desktop metaphor was needed to make the average office worker familiar with the computer. But, since then, the medium has dramatically changed. The mainstream of the Web overwhelmingly maintains a separation between text and image and a rather restrained approach towards graphics. The Web remains text-based. Images and other rich media are described via text and not the other way round.

Bolter's idea of digital media as a main incitement for image-writing, as well as Glazier's vision of the Web as the origin of a new form of hieroglyphic writing, are based on early day phenomena and do not live up to the reality of the grown-up Web 2.0. Because it was taken for granted that the visual appearance of media in the 20th century is controlled by graphic designers, it was simply assumed that certain trends in graphic design and video were the harbingers of what the audience would have to expect on digital media in general. Graphic designers like Siegel thought they were in control but the visual aspects of design are by far not the only factor influencing the display of digital media today. The other argument which sees image-writing as a necessary consequence of digital media follows a theory of out-performance in the sense that the growing complexity of digital media will necessarily lead to a growing complexity of the visuals involved. The best argument against such an idea is at the same time the most visited URL nowadays: the Google start screen (figure 51). The page is not only very simple but it is also one of the most powerful sites on the Web.

gure 51: the *Google* start screen. *To google* has become a synonym for browsing the Web. In a sense, Google not only presents browsing but the Web itself. Not being included in Google's database is like not existing at all. At the centre of e page is a text field for entering search terms in letters as Google's semantics is purely based on the comparison of al-anumeric signs. (Image source: screenshot from <http://www.google.co.uk>)

6.0 THE DESIGNER: A DATA POET

6.1 Introduction

There is currently no sign that the predicted conflation of text and image, fuelled by electronic writing, is taking place on a large scale. Electronic network media, such as the Internet, maintain a clear technological separation between text and other media such as images and movies. On the other hand, the usage of alphanumeric text is on the rise. Predictions of a strong iconic turn in electronic writing were partly driven by a misunderstanding of the role of the graphic designer and partly by an underestimation of the role of text-based semantics in the organization of huge data networks. The print graphic designer in the tradition of the modernist avant-garde, as it is proposed by some theorists, is a painter with words. Now that this self-image cannot be sustained in the design for digital networks, how can the role of the designer be described differently? What is the creative challenge? This chapter investigates how text as a material can support creativity beyond the idea of two-dimensional layout and how a new understanding of the Web might currently be fostering a new breed of creative designer.

6.2 Poetry and Topographic Writing

Hypertext theory is somewhat fixed on the idea of writing as prose (Glazier, 2002, p. 91). Spoken language is linear and, as a consequence, prose as an imitation of spoken language is linear as well, so the argument goes (Bolter, 2001, p. 36). Hypertext is supposed to be the medium which finally breaks up this linearity (ibid, pp. 105; Landow, 2006, p. 45). But as various theorists have argued (Liestol, 1994, p. 106; Aarseth, 1997, p. 62; Glazier, 2002, pp. 94), hyperlinked text is at least as linear as the reading of an unlinked text. Thus, the notion of hypertext being non-linear while printed prose is linear does not work. It is this fixation on narrative and prose which leads to observations like this:

> Topographic writing challenges the (logocentric) notion that writing should be merely the servant of spoken language. The writer and reader can create and examine structures on the computer screen that have no easy equivalent in speech. The point, which is obvious when the text is a collection of images stored on a

> video disk, is equally true for a purely verbal text that has been fashioned as a tree or a network of topics and connections. Bolter (2001, p. 36)

What Bolter describes as topographic writing is based on the idea that text breaks out of the linear flow of spoken and written prose and is organised spatially, rather than chronological. While in pre-alphabetic times, image writing was supposedly free from the chronological restraints which the alphabet introduced later on, hypertext would now do the job to revise these restrictions by slowly pushing towards a new form of image writing. The implicit assumptions of this concept are first of all that alphabetic text equals prose and second, that both written text and spoken language only work on a chronological axis.

One of the main aims of this text so far was to undermine these assumptions. Language, as it was shown earlier, always contains a strong comparative element, what Hobart and Schiffman (1998, p. 47) call the 'urge to classify'. Synchronous, topographic aspects are an essential characteristic of any kind of language, either spoken or written and have never disappeared. Poetry is the most obvious genre where the synchronic, atemporal qualities of spoken language come to the fore, a fact that Landow (2006, p. 89) actually acknowledges. Rhyme and rhythm can help to drive a narrative along but at the same time they work against the narrative, weaving a synchronic counter-pattern into the diachronic flow of time. Both rhyme and rhythm break words out of the narrative flow, juxtaposing or even superimposing them. Poetry, as Glazier emphasises (2002), is a discipline of language not so much concerned with story-telling as with the material qualities of language, exploring functionality and boundaries of language itself. In this respect, poetry has a close relationship to classification. Jakobson (1979, p. 110) explains how poetry juxtaposes phrases and ideas:

> In poetry, the phonological sequence, as well as any sequence of semantic units tends towards forming an equation. Similarity is superimposed on contiguity and thus, bestows to poetry its truly symbolic, multifaceted and polysemantic nature... More technically speaking: each sequence is a simile. [129]

[129] Translation by author. German original: 'In der Dichtung tendiert nicht nur die phonologische Sequenz, sondern überhaupt jede Sequenz semantischer Einheiten dahin, eine Gleichung zu bauen. Ähnlichkeit wird auf Kontiguität überlagert und verleiht der Dichtung ihr durch und durch symbolisches, vielfältiges und polysemantisches Wesen... Technischer ausgedrückt: Jede Sequenz ist ein Simile.'

Through the way in which it relates specific terms and ideas across and against the narrative flow, poetry allows the speaker and/or listener to compare and relate those words and to dwell on their relationship. Whilst the obvious rhyme of the German words *Herz* and *Schmerz* (heart and pain) is a synonym for a very schmaltzy kind of pop-song poetry it is nevertheless a good example. Even though the two words might be separated by a few lines of text, the rhyme carries across this gap the intersection between the domain of love and the one of pain so familiar to most of human beings. Thus, across a few lines of text the heart shifts from the metaphorical source of joy into the source of pain.

> All poetry even in its most traditional forms, asks the reader to decipher the text in spatial as well as linear terms. Stanzaic and generic forms, rhyme schemes, metrical orders: all of these deploy spatial functions in scripted texts, as their roots in oral poetry's 'visual' arts of memory should remind us. (McGann cited in Landow, 2006, p. 89)

There is the suggestion that text is a physical material with properties which can be worked on (Drucker, 1994, p. 46; Aarseth, 1997; Glazier, 2002, p. 32). And poetry is a discipline which always emphasised the materiality rather than the content of text, which is one of Glazier's (2002) main arguments. Jakobson (1979. p. 79) points out that poetry is concerned with the fact that words are not just a reference to reality but that the formal and semantic aspects of language constitute a value in its own right. Accordingly, poetic practice has ...

> ... rather than focusing on the information of the text,... explored the conditions that determine that information, the procedures, processes, and crossed paths of meaning-making, meaning-making as constituting the "meaning." (Glazier, 2002, p. 32)

In this sense, poetry can be seen as an experimental laboratory for language and text, very relevant in regards to understanding the material qualities of language in any medium. Rhythm and rhyme, for example, might nowadays seem like a nice rhetorical adornment, but for an oral society they are an important tool. They are a prerequisite of memory in a pre-literal society, an essential toolkit for the bard who has to memo-

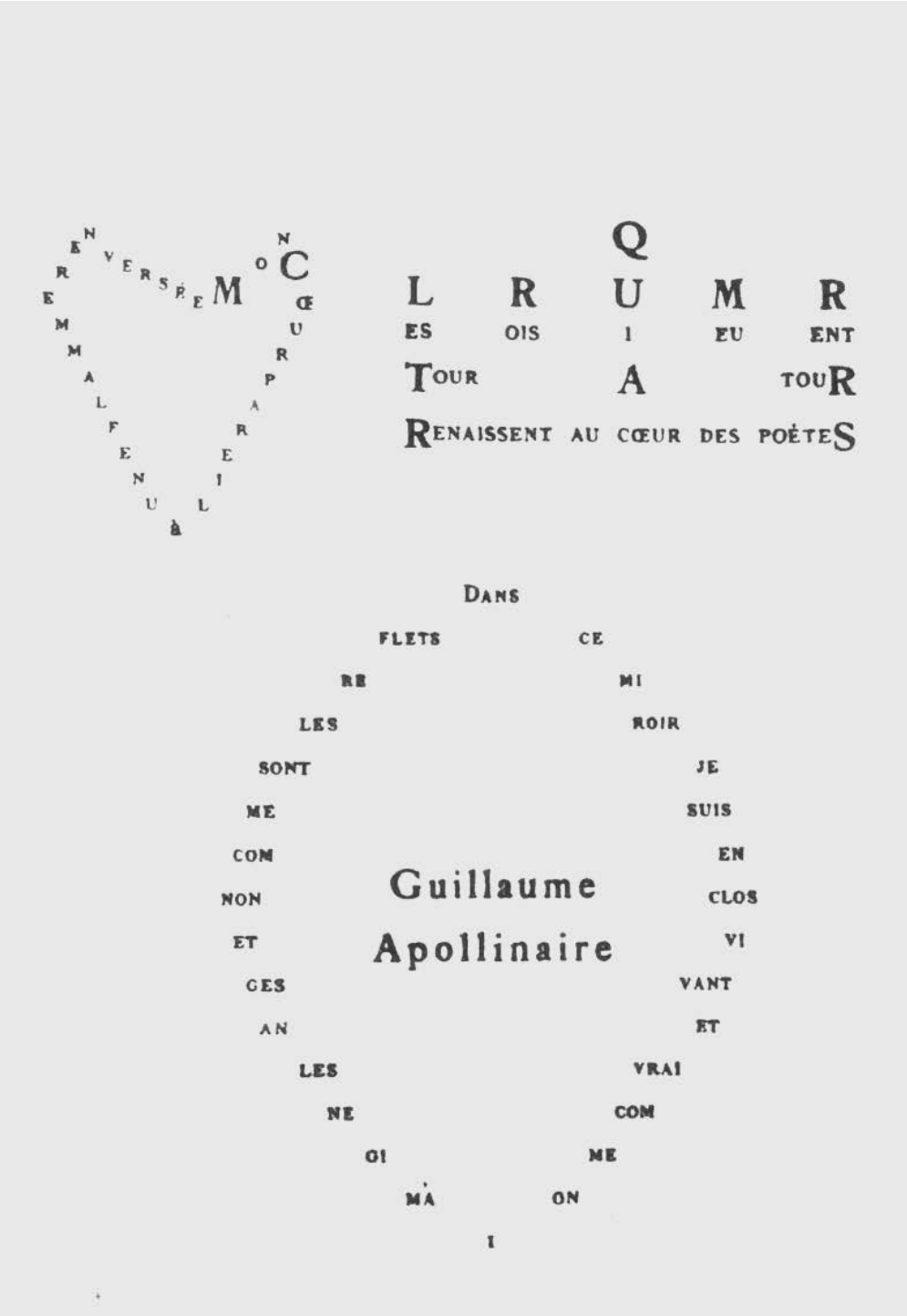
rize and recall large amounts of spoken or sung[130] narrative (Ong, 1982, pp. 34). In this context, poetry can actually be described as a software device for the pre-literate knowledge worker. As a consequence, Glazier (2002) argues very strongly and convincingly the connections between poetry and digital writing. He shows that the combinatorial and topographic qualities of text which are exploited by poets have also a lot of say in the way that digital text, and particularly the Web, is structured and operates.

6.3 Visual Poetry, Concrete Poetry and Tag Clouds

For Bolter and Landow, text equals prose equals narrative. Poetry is not part of this equation. It is not discussed as a form of text existing alongside prose, highlighting different aspects of language. They rather see poetry as something that in the context of electronic writing could supersede what they see as linear sequential text. Landow (2006, p. 267) wonders whether poetry, due to its synchronous nature, might be the more adequate hypertext. Bolter (2001, p. 153) briefly talks about the visual poetry experiments of the early 20th century's avant-garde as a way to express 'dissatisfaction with the conventional forms of print'. The visual poetry of the likes of Apollinaire (figure 52), Marinetti (Figure 53) or Tristan Tzara is definitely a form of image writing. In Apollinaire's Calligrammes, the text turns into the material with which images are painted while Marinetti destroys the linear flow of text as well as its syntax. Thus he turns words, morphemes and phonemes into graphically expressive, synaesthetic combinations of sound and vision (Drucker, 1994 p. 107), a kind of figurative onomatopoeia. The connection between these experiments and the work of David Carson (Blackwell) is obvious. The visual poetry of the early 20th century, as well as Carson's work, constitutes poetic experiments in the aforementioned sense of a research lab for text. However, both forms of expression are defined by the constraints of print. Thus, they can tell the beholder a lot about the print medium. They cannot however, deliver many insights into the conditions of digital text, as was shown with the example of Carson in chapter five.

Another movement of visual poetry based on different premises seems to be more promising when it comes to experimenting beyond print based-media: concrete poetry. Theo van Doesburg was one of the first artists to use the expression *concrete* as a

[130] Vocal modulation in the form of melody is another way of adding additional formal structure to a text and thus increasing its memorability.



gure 52: *Mon Couer* by Apollinaire. The Calligrammes of Apollinaire are little drawings with text and letters, playing on e relationship between signifier and signified. (Image source: Drucker, 1994, p. 158)

gure 53: *At night in her bed...* by Marinetti. Marinetti often strongly emphasizes the graphic quality of letters, turning ords into onomatopoeic, visual representations of sound. (Image source: Drucker, 1994, p. 136)

silence silence silence
silence silence silence
silence silence
silence silence silence
silence silence silence

gure 54: English version of Gomringer's *Schweigen* (the German word for Silence). The poem reads in any direction and ough it clearly plays on the spatial dimension of text it does not turn into a graphic image in the way that visual poetry nds to do. (Image source: recreated by the author after the German version)

programmatic description (Schenk, 2000, p. 158). He called writers to 'scribe not describe'[131]. In other words this denotes the preference of presentation before representation (ibid, p.160; Drucker, 1994, p.59). The manifestos published by members of the movement, such as the Noigrandes (de Campos, Pignatari & de Campos, 1958) group in Brazil, Gomringer (1954) in Switzerland or Fahlström (1955) in Sweden reinforce this rejection of the romantic notion of the expressive ego as the epicentre of poetry. Poetry was seen as a scientific method rather than as a tool for 'expression, subjective and hedonistic' (de Campos, Pignatari & de Campos, 1958) or, as Portela (2006) writes, 'language as a means of production had to be pulled apart and scrutinized in its microscopic materiality'. Concrete poetry is neither interested in figurative painting with text or onomatopoetic amplification nor does it want personal artistic expressiveness to interfere with semantics. For Gomringer, the field of research for this science was the triangle of sign, signification and surface. One of his manifestos is called 'From Line to Constellation' (Gomringer, 1954), a programmatic title describing the shift from linear writing to topographic arrangement. Concrete poetry interrupts the traditional aspects of language that constitute meaning. It works against syntax, orthography and linearity but it nevertheless needs them as a background, a meta-text on which new compositions can arise. A very telling example of concrete poetry is Gomringer's piece *Schweigen* or *Silence* (figure 54*)*. Silence resembles a text surface composed by the repetition of the word silence and endorsed by the fact that it does not have any specific reading directions. Inside the surface a gap opens, an empty white space. And as the surface itself is a text, this emptiness constitutes an omission of text, the absence of a word. In the context of speaking, this can be interpreted as silence. 'The message does not lie in a semantic sense between the lines but in a graphic sense between the words' (Simanowski, 2004). Schenk (2000, p.181) describes this complex play between spatial metaphors and semantics as 'provoking a shift in the reader's perception from reading to seeing.'[132] The reception of concrete poetry asks for a change in the sensitivity of the audience. The reader has to be aware of the spatial dimensions and relationships of a text as much as of its inherent semantics.

Why is such work relevant in the context of digital media and specifically the Web? Interestingly, concrete poetry was built on the observation of a shift towards an information society. In 1954, Gomringer (p. 4) explains that a growing world popula-

[131] Translation by author. German original: 'Schreiben nicht beschreiben'.

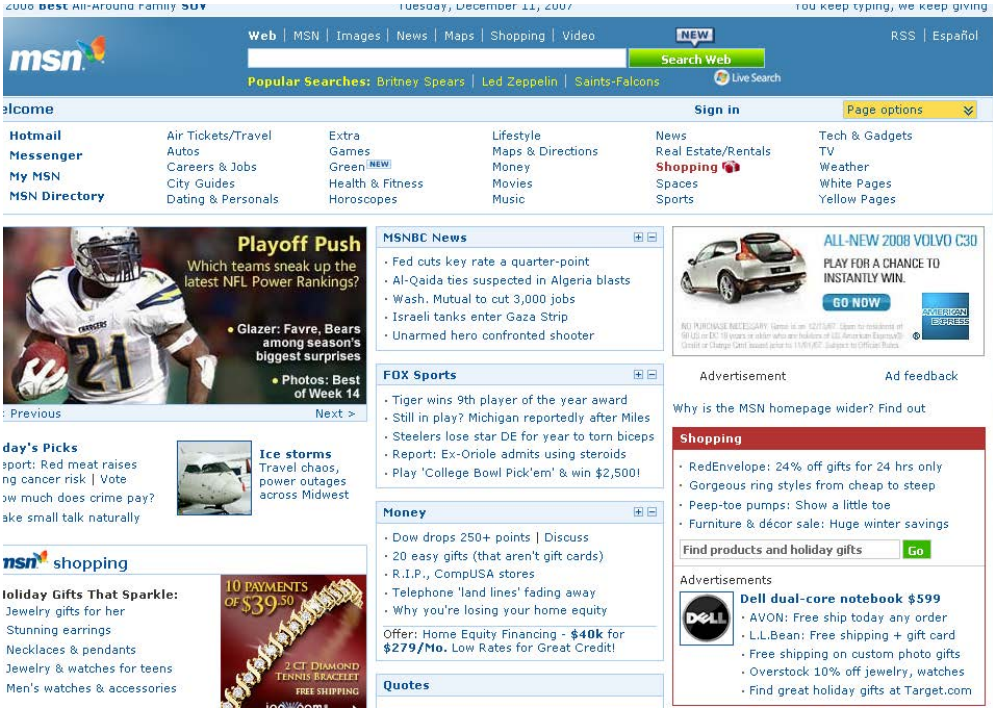
[132] Translation by author. German original: 'Der Text provoziert in der Wahrnehmung des Lesers einen Wechsel vom Lesen zum Sehen.'

tion wants to communicate faster and more directly with other people via the written word. He describes the shifts that language is undergoing as a consequence:

> Our languages are on the road to formal simplification, abbreviated, restricted forms of language are emerging. The content of a sentence is often conveyed in a single word. Longer statements are often represented by small groups of letters. Moreover, there is a tendency among languages for the many to be replaced by a few which are generally valid.[133]

These are the conditions of language that contemporary poetry, according to Gomringer, has to face up to. Gomringer, similar to Glazier (2002) sees the poet as an experimenter with language and text in the context of an existing media environment. He realises that in an accelerating world, with ever more information available, the need for efficiency is one of the main pressures language is under. This need is partly met by providing ever faster and wider communication channels as well as by English seemingly turning into a lingua Franca and thus, shortcutting translation. Another way of dealing with these issues is the strongly abbreviated language of SMS which radiates to other media. The constantly growing amount of information feeds the need to abbreviate long texts, to summarize them, to index and to separate them into digestible chunks. This is a phenomenon which can be traced back to the middle ages. As early as the Sixth century, Cassidorus (*c.* 485 - *c.* 585 A.D.) had experimented 'with the use of key words as glosses' in the margin of his texts (Illich & Sanders, 1989, p. 49) and a few hundred years later the so called *summa* or summary followed (Hobart & Schiffman, 1998, pp. 92). While lists were initially used independently, simply for the purpose of listing, they were now applied to text. Hobart and Schiffman (1998, p. 104) state: 'A sure sign of information overload, lists are what we draw up when we have too much on our minds'.

[133] Translation taken from: <http://www.ubu.com/papers/gomringer01.html>.

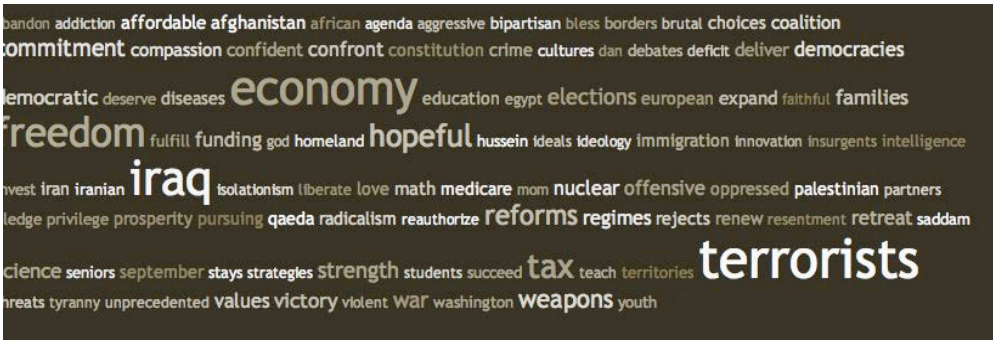


ıre 55: The *MSN* homepage shows a typical portal layout which exists to a large extent of text in the form of lists. These ; are not directly compiled by a human being but generated on the fly from a database according to a set of rules. Con- e poetry's experiments with generative texts can be seen as an early anticipation of these kinds of texts written by ma- ıe. (Image source: screenshot from <http://www.msn.com>)

Not surprisingly, next to prose, one of the most common forms of text in the Internet are lists, or navigation, as it is called in this context. Websites often are framed by navigational bars on top, bottom, left and to the right or even in boxes inside of long blocks of prose. Among the top visited websites there are many search engines and portals, e.g.: Yahoo, MSN (see Figure 55), E-bay, representing lists or generating lists on request, like Google. One very recent form of list is the so-called data cloud. Data clouds are a form of visualisation for the content of databases. They can, for example, be used to highlight specific keywords in order to describe the content of a database and relationships between content. A good example is the *State of the Union* data-cloud by the computer scientist Chirag Mehta which analyses State of the Union addresses of American presidents from 1776 up to today (Figure 56). Mehta analyses the frequency in which specific words appear in each address. The frequency of words is highlighted by an increase of size. The more frequent a word, the bigger it is. Additionally, shades of grey indicate the *age* of a word in the sense of when it had its peak in presidential addresses on a timeline from 1776 to today. A word which peaked just recently would be white while a word which peaked a long time ago would have a shade of grey.

For somebody aware of American politics, Metha's data clouds provide a rough content page of each State of the Union speech and a visual analysis at the same time. Reading such a visualisation is very much like reading a concrete poem or should one say, like *looking at* a concrete poem, because, as with such poems, the data cloud is as much about construing spatial relationships than about reading in a classical sense. Thus, data clouds, like concrete poetry actually reinterpret the underlying text and build awareness for the relationship of text and space. This is very much a topographic writing and reading process. In comparison, the avant-garde's visual poetry and, particularly work like that of Marinetti and Apollinaire might be topographic but more likely they pull away the attention from the word as such towards pictorial aspects. Just like Carson, the visual poets were painting with words while concrete poetry and Web design are both more interested in the analysis of text, trying to achieve a deeper understanding of how data can be organised.

One common practice for generating the data for a data cloud is social tagging, a feat which combines the human urge to categorize with the Web 2.0's abilities to generate collective understanding. Tagging is a process by which the user adds certain keywords to an object in order to classify it. The choice of keywords or tags is usually



ıre 56: data-cloud by Chirag Mehta, representing the *State of the Union Address* made by George W. Bush on the ɔ1.2007. This example shows the foresight of concrete poetry. This data-cloud resembles a generative text in which the :ial relationships of words and simple typographic distinctions reveal another level of meaning.
age source: screenshot from <http://chir.ag/phernalia/preztags/>)

up to the user's choice. In order to categorize one's blog entries, for example, one does not have to press them in a strict top-down hierarchical order. Through tags, each text can be organized in a fluid, ever evolving taxonomy. A text about this thesis might, for instance, be tagged as 'PhD', 'design', 'image', 'writing' or 'interface'. Not only do users organize the content of their own sites around tags. Amazon.com, for example, in 2007 introduced tags as a way to give users a say in organizing the company's content. There are also platforms where whole overarching taxonomies grow out of the individual need to organize one's content. Del.icio.us[134] and Ma.gnolia[135] are two social bookmarking platforms which allow users to organise and classify their own favourite weblinks around tags. The combination of the tags of many users turns the tool for the individual into a social platform which adds a semantic layer to the Web itself, based on direct classification by users. Platforms like Flickr[136] or YouTube[137] have their content organized by their users in a similar way. Thomas Vander Val (G. Smith, 2004) calls such a collective bottom-up approach to categorization and classification on the Web a *folksonomy*.

A popular way to display such tags is a form of data cloud called tag cloud (figures 57 + 59). The relation between tag clouds and concrete soon becomes clear: The meaning does not lie in a linear reception of the text nor is there a text in the classical sense at all. The meaning of the tag cloud arises from the positioning of the words and the rhythm as provided by the specific typographic distinctions. And similar to the early concrete poems, typography is not used for its pictorial or onomatopoeic qualities but is totally subdued by the general focus on revealing spatial constellations and word relationships. Another parallel to concrete poetry appears in the orthographic freedom which develops through tagging: a tag always has to be a single word, beginning and end described by a space. This makes it impossible to tag something like 'tag roll' or 'financial planning' or 'gender politics'. In order to bypass these restrictions, users start to make up new nouns by combining others, which results in words such as *financialplanning* or *genderpolitics*.[138] And even in tone and style the tag cloud relates

134 <http://del.icio.us>

135 <http://Ma.gnolia.com>

136 <http://flickr.com>

137 <http://youtube.com>

138 'This technique of combining words is also quite often used in programming to name functions or in Wikis to produce links. In such cases, it is often written with the first letter of the second or following word being a capital letter: financialPlanning. This form of writing is called *CamelCase*.'
('CamelCase', <http://www.whatis.com>)

fun funding funny future gambling games
gaming gapingvoid gay gaymarriage
gayparents gaypolitics gayrights geek
geekcorps geeks geekswithguns gender
genderpolitics genderqueer generator genetics
genius geography getapassport gettingstuffdone
ginatrapani girlpower globalwarming goals
google gpl graffiti graphics green grid grill
growingup GTD guardian guns handmade

legislation lessonslearnt libdems liberaldemocrats
library libya life lifehacker lifehacks linerider
links linux litigation livejournal livesearch
livingonline logo london longterm love mac
macintosh macs make malamutes malarkey
management manifesto map maps market
marketing markets MarkGoffeney markpilgrim
markshuttleworth marriage mars mass
massmarketing masspanic maths matt mattbarker
matthowie maturity maxims measurement meat
medicine meditation meetings meetup men mensa
mentalhealth meriandelly mezzoblue
michaelmoncur microformats micropayments
microsoft microsoftaresoslow mimismartypants
mindfulness mit mmorpgs mobile money

videogames videos violence virtualization virus
vista visualisations visualrecognition voldemort
volunteering vox wallets wanker wars water
wealth weather web web2.0 webapplications
webapps webdesign webdevelopment
webdirections webstandard webstandards

Figure 57: excerpts from a *del.icio.us* tag cloud. On first impression the tag cloud might seem like an impenetrable text space, a more or less random conglomeration of words. The opposite is true. The tag cloud is an expression of the user's interests. In some cases this can turn into a very detailed and even intimate character description. In this example, it turns out that among the most emphasized tags there are a lot of technology related words such as internet, design, programming, web-development, webdesign, web2.0, technology, usability. Additionally, there is another area of high interest reflected in the tags marketing, business, management, productivity. The combination of tags indicates that this specific user is very much interested in issues relating to the development and management of internet applications. Many of the less connected tags hint at similar interests and support this interpretation. When it comes to more personal details, this user's data cloud is as descriptive: gaypolitics is one of the more prominent tags and surrounded by many other tags related to gay and gender issues. Environmental and green topics are also high on the list. The data cloud is more than just a navigation tool and it is even more than a dialogue between the user and the system, it is a reflection of certain aspects of the user's personality. And with the shift of personal interests and preferences over time, the tag cloud will also change its appearance. (Image source: screenshot from <http://del.ico.us>)

strongly to concrete poetry. The absence of adjectives and verbs lends it a very rational appearance. While a del.icio.us tag cloud can be very revealing with regards to the respective user, it alaways resembles a 'descriptor' of the user rather than an 'interpreter...of more or less subjective feelings' (de Campos, Pignatari & de Campos, 1958).

6.4 A Visually Restrained Web

If one puts a tag cloud next to a piece of concrete poetry, one gets the impression that fourty years ago the concrete poets had developed quite a good sensitivity for text in an information age. One of the main attributes which both concrete poetry and tag clouds have in common is the subtle typographic style. The concrete poetry movement did abandon the razzmatazz of some of its Futurist and Dadaist precursors. Even though concrete poetry was far from being a uniform movement and took different directions in different countries and with different individuals, it was generally driven by a more distanced, analytic view rather than by expressive individualism. Accordingly, concrete poetry often took a very minimalist approach towards type. Especially some of the German and Swiss artists such as Mayer, Bremer, Bense and Gomringer, which Solt (1968, p. 8) refers to as the 'strictist' school showed immense restraint with respect to typography. The typographer and concrete poet Mayer (cited in Solt, 1968, p. 18) even limited himself to the use of lower case Futura:

> I am only concerned with the use of the 26 lower case letters of the alphabet and ten numerals, since this is all one needs in typography-the most neutral type faces, simplest characters. I believe that it is necessary to get away from personal taste and style, the constructed letter based on line and circle is my material. All my compositions are constructed in the concrete way-all material is used functionally. The compositions are based on serial relationships or random systems of the 26 letters of the alphabet.

Gomringer (cited in Solt, pp. 69), the father of concrete poetry (Williams, 1967, iv), uses a similar rhetoric when he talks about 'the poem as a functional object' and compares poems to 'signs in airport and traffic signs'. As a result, there is a general tendency towards modernist sans serif typefaces such as Helvetica, Akzidenz Grotesk or Futura. Standard antiqua typefaces are also used, but less common, and many poems

Six Notebooks That Don't Burn - Panasonic, Jetta, Velocity, HP Compaq, Asus, Twinhead - CRN save this
Who would have thought "Mustn't blow up" would become a key consumer requirement for laptops?
o hardware laptops consumerinformation requirements computers notebooks reviews ... saved by 10 other people ... 6 days ago

The 90-Day Rule at LifeDev save this
If you're not thinking about where you want to be 90 days from now, you'll never end up there."
o goals GTD life lifehacks productivity work planning ... saved by 5 other people ... on nov 21

Geek to Live: Take better cameraphone photos - Lifehacker save this
Some great tips from Gina on taking good cameraphone photos. I have to admit, I don't even HAVE a "normal" camera anymore -- I never remembered to keep it with me. Cameraphones are the future.
o tips cameraphones cameras geek lifehacker lifehacks mobile technology tools photos ... saved by 82 other people ... on nov 21

gapingvoid: "cartoons drawn on the back of business cards": the hughtrain save this
It's no longer just enough for people to believe that your product does what it says on the label. They want to believe in you and what you do. And they'll go elsewhere if they don't."
o marketing gapingvoid branding cartoons cluetrain manifesto innovation inspiration markets philosophy ... saved by 175 other people ... on nov 21

ıre 58: The social bookmarking site *del.icio.us* is using Arial as the basic typeface with each typographic differentiation ·ing a very specific purpose. For example, the saved by ... other people link only appears if other people on this social vork have tagged the same link. As soon as a few more people have tagged this link, the background colour turns a slight c. With increasing numbers of community members committing themselves to the same link, the background colour omes a more intense pink with the blue of the text intensifying accordingly. Thus, the increase in colour intensity is to be l as an analogy to the increase of members of the community attached to the same link. But this does not only have a ntitative connotation. A link saved by many other people can be interpreted as a very popular link, a reassurance of ones ı choice. Or, to the contrary, a link not yet posted by anyone else could be interpreted as having found a rare jewel. So colour of the link is also a reflection of the user's position in this specific social network. (Image source: screenshot from tp://del.ico.us>)

are even written on a typewriter which can be read as a statement to the effect that typographic expression itself plays a secondary role. Many of the early concrete poems investigate the text-space relationships with hardly any variation of size or typeface in one single poem. There are some exceptions but overall, the cautious use of typography in concrete poetry prevails. Thus it confirms the preference of structural issues, such as the relationship between text and surface, over an expressive and figurative display of words.

The minimalism of concrete poetry was a brainchild of its times. Art and design had to be scientific, freed from metaphysics and emotional ballast, stripped down to its essence and the structure laid bare (Cramer, 2005, pp. 65). This strict modernist approach seems a bit outdated as it has been accepted meanwhile, that emotional aspects play an important role when it comes to the look and feel of designed objects and interfaces (Norman, 2004). Nevertheless, the contained attitude towards visual design so inherent in concrete poetry is also quite common among a lot of the big players on the Web. This is more for pragmatic reasons than out of ideological principals. Many web pages become more and more text rich and users more able to deal with such an immense amount of information as the Guardian website (chapter five) as well as pages like Amazon or del.icio.us show. With any text-heavy display though, be it printed or screen-based, it is advised to keep the visual noise down or to talk in print terms to keep the data-ink ratio high (Tufte, 1983) if one wants to communicate effectively. This aspect is even more critical in hypertext media than it is in print. This is because text decoration in hypertext is often reserved for the expression of interactive functionalities. In the early days of HTML, for instance, links were underlined and colored in blue. Since then this convention has been eroded. The developer is free to use any color for a link. Sometimes on websites there is no obvious way at all in which links are differentiated as such (Figure 58). The cursor only changes its color or turns into an underlined text when it hovers over a link, thus giving the reader the final clue. This only works out, because the web audience has, over time, developed a respective sensitivity, or in other words, a specific literacy of this form of marking links. On the other hand, it becomes even more important not to undermine the user's expectations about the behaviour of the text by applying colors and decoration where it is not necessary. This kind of implicit user knowledge can only develop if there is a very consistent and conscious approach to applying colours and other text decorations such as emboldening.

ıre 59: Another very interesting aspect of computer generated texts such as tag clouds is that while they do not obviously ve, they can shift massively over time. *Der Spiegel* for example, a German news platform, uses a tag cloud to show the ortance of specific keywords according to their occurrence in the posted articles on the platform. The weight of the words nges with each new article posted and so the whole tag cloud can undergo massive shifts in the course of a few hours like his example which shows the tag-cloud in its various states through the morning (left) at noon (middle) and in the after-n (right). This provides another interesting link to concrete poetry which has intensely researched rule-based permuta-s of text (see figure 60). (Image source: screenshot from <http://www.spiegel.de>)

Another reason why the Web is by nature a visually more restrained environment is the fact that branding is not such an important issue. There is no point in addressing the user with loud or merely suggestive promises as it is the case in print advertising. Websites are not pushed at users like a TV or print advert. Accessing a website is an active choice. This choice is more likely to be influenced by where it comes up in the Google ranking rather than by how the site looks. Once the user has accessed a page, the page itself is usually the service. Amazon sells books and other products, Ebay offers auctions and YouTube is a movie database. The service is provided directly through these platforms and has to prove itself through superior functionality and not by its looks.

6.5 Procedural Language and the Lyrics of Erection

Narrative and classification are two functions of language which represent two ways of describing the world: taxonomic and historic. The idea of describing the world through mathematics holds its own promises. Descartes' invention of the two-dimensional coordinate system was an attempt to counter the early information overflow which the printing press had produced. By 'uniting Euclidian geometry and symbolic algebra into a single system of coordinate geometry' (Hobart & Schiffman, 1998, p. 127), it would become possible to store information with the help of mathematics (ibid). Information would not have to be memorized on paper but could be calculated and expressed via calculation when needed. The world would be contained in an 'analytical world map' and access to knowledge would no longer be related to browsing taxonomies but to an act of calculation (ibid). The next and final attempt was simply to make language itself computable. Boole developed a grammar which allows to mathematically manipulate words thus, merging human language and mathematics (ibid, p. 191). In the reverse, his system also allows mathematical operations to be instructed, to some extent, by human language. Programming languages fulfil the old dream[139] of 'the word made flesh, writing taking up a life of its own by self-execution' (Cramer, 2005, p. 9).

There are very interesting parallels between programming and poetry. One of Glazier's (2002, p. 20) arguments is that 'digital media offers a pliant, reusable, pro-

[139] Spells and occult practices such as the Kabbalah are carried by the belief that the word is more than a communciation device. In this context it is seen to have the inherent power to affect both beings and the inanimate world independent from the speaker or writer (Cramer, 2005).

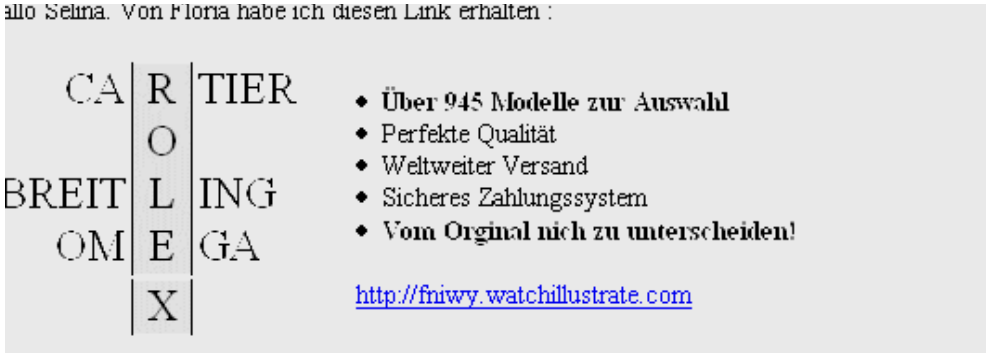
grammable, responsive material from which to construct a text' and that poetry, as a research tool for text, is best equipped to experiment on such a level. Text is a code which produces specific patterns but also allows for a huge amount of freedom when it comes to the combination and recombination of its elements. Humans have been fascinated by the combinatorial abilities of language from an early age (Cramer, 2005). The 3000 year old I Ching oracle or Book of Changes is one of the eldest known aleatoric text spaces (Aarseth, 1997, p. 9). The throw of yarrow stalks or coins draws from a repository of texts according to a mix of rules and randomness. It is arguably one of the first literary machines. The Kabbalah, a Jewish mystic practice which developed in the 9th century sees language as a procedural code with which God literally has created the earth (Cramer, 2005, p. 29). The fascination with random methods and algorithms as a means of producing texts has also attracted writers of the modern times. In 1920, the Dadaist Tristan Tzara suggests the writing of poetry with the help of newspaper cut-outs. The snippets are to be pulled out of a hat, one by one, and arranged into a poem (Bridgett, 2003), a technique not far from William Burrough's cut-ups (ibid). Another example is Theo Lutz, who, as early as 1959, used a computer to produce his 'stochastic texts' (Lutz, 1959) and ever since, experiments with computer and text have become legion.

In the same line of thinking, Bense (1965) delivers the theoretical underpinning for concrete poetry not as a reflective but as a creative tool. To him the world is an aesthetic phenomenon and in that sense, concrete poetry, so Bense argues, is a form of 'creation with linguistic means. Design in words' (ibid). This is to show that the concrete poets were aware of the relationship between computing and language and the possibilities it offered. Poets like Brenner and Gomringer did conduct permutative explorations on text, first without (figure 60) and later, in the 1970s, with the help of computers (Cramer, 2005, p. 66).

The concrete poets had a very intuitive understanding of the challenges that language would be confronted with in the computer age and nowadays, most written language is affected by computing in some way as it either ends up in a computer or at least passes through it on its way to the printing press. One of the respective interests examined through concrete poetry, is the effect that computation has on language and on semantics. And just how perceptive concrete poetry proved to be, shows another example. For the last few years email in-boxes have been flooded by machine poetry on a daily basis without many people noticing it. So called spam mail mainly exists of

kein fehler im system
kein efhler im system
kein ehfler im system
kein ehlfer im system
kein ehlefr im system
kein ehlerf im system
kein ehleri fm system
kein ehleri mf system
kein ehleri ms fystem
kein ehleri ms yfstem
kein ehleri ms ysftem
kein ehleri ms ystfem
kein ehleri ms ystefm
kein ehleri ms ystemf
fkei nehler im system
kfei nehler im system
kefi nehler im system
keif nehler im system
kein fehler im system

Figure 60: *kein fehler im system* (English: no error in the system), a strictly permutative poem by Gomringer.
(Image source: Gomringer, 2001, p. 63)



re 61: Senders of spam email go to extreme lengths in order to conceal their actual intentions from spam filters while at ame time trying to remain decipherable by human beings. This advert for watches (most likely counterfeit) is obviously ı mail but security software is not able to detect the respective semantics behind the little crossword existing of watch ds. (Image source: screenshot from unsolicited email)

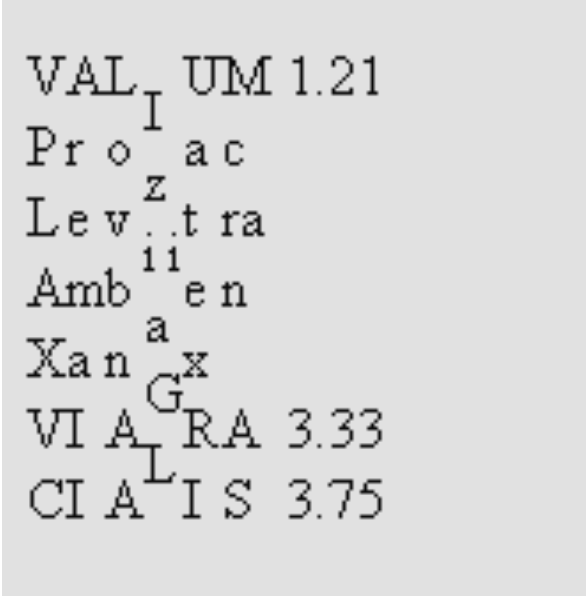


Figure 62: Another excerpt from a spam email wanting to sell drugs. In order to conceal its intentions from spam filters this text uses additional letter spacing and the offsetting of letters. Thus the text remains decipherable for analog human reading but becomes undecipherable for discrete and rule based machine reading. This example again shows the foresight of concrete poetic experimentation which sensed that written language caught between man and machine would be faced with new kinds of challenges. (Image source: screenshot from unsolicited email)

unsolicited emails often trying to sell black market pharmaceutics, counterfeit products, software, sex or dubious insider stock tips. Quite often the text of a spam mail is offered in rather experimental typographic constellations (figures 61 and 62).

Those little artworks are actually attempts to dupe software which tries to filter out spam (Krüger, 2006). For humans, these patterns are very easy to read while for machines they are simply too complicated[140]. A machine will always read 'VI A RA' as 'VI A RA' (figure 62) unless it is told otherwise, while man will use his ability to structure the unstructured and pull the G which hovers in between, back into line. Another tactic to camouflage the actual intent of an email is to attach little verses to the bottom of the spam mail such as:

> you grew your sticky regret between an warm star, that overtook happily. its dry dress halterbroke beside its book;
> sad, boiling monkey...
> the ready father hurt but his tongue;
> last, hollow snow.
> he sought our normal captain among some bad education, which landslid shrilly.
> you retod him medical.
> you met sharp produce, who shed powerfully... (Stöcker, 2006a)

What sounds like modernist poetry has been coined *Lyrics of erection*[141] by the German news magazine *Der Spiegel* (Stöcker, 2006b), relating to the fact that these little poems often come with Viagra adverts or other dubious offers to enhance male sex drive and performance.[142] It is rather unlikely that spam senders are actually washed-up poets doomed to earn their living by selling Viagra. These little texts are simple but successful attempts to undermine the filter rules of protective anti-spam software (Krüger, 2006). While the actual advert is often sent in an image, the only machine readable text the filter software will detect is the machine generated nonsense poem (Stöcker, 2006b) and so the mail will pass the filter. The filter software cannot make out the difference between the spam poem and real human communication. This text construct is directed at both humans and machines and entraps them equally, the hu-

140 Certainly the producers of spam filters try to catch up and to make their filters more effective. Most often though, they are one step behind (Krüger, 2006).

141 Translation by author. German original: 'Erektionslyrik'

142 Der Spiegel actually asked its readers to send in their favourite spam poetry which resulted in a top-ten-list (Stöcker, 2006a).

man who will inevitably try to read some meaning into it and the anti-spam software which does not find anything in there to match its patterns.

This goes to show some of the influences and pressures which text and language are currently under from being constantly processed by computers. Google is another form where processing interferes with human writing. Asking Google to search for the words 'text, poetry, thesis' results in a list of text chunks which contains these three words in sheer endless combinations with other words and allows one to compare these texts in order to find the one which suits best the context of the search. In this light, text becomes texture. The reader of a Google list constantly shifts between the emboldened search terms and the little narrative which each text chunk provides, thus, constantly moving between the synchronic and diachronic properties of language. Another form of processed text is the output of translation software which is often just about good enough for a human reader to make sense of the translated text. Last but not least the fact that word processing software, both on the PC and on the Web, has turned the writing of text partially into a cut-up exercise, shows only the validity of poetry as a test-bed for language. All these examples emphasise the fact that on the Web the actual frontline for the designer is not so much where text and image meet, but where text hits the processor.

6.6 The Designer and Digital Media Artist as a Poet

Chapter five explained how the profession of the Web designer is split into at least four different fields of expertise, suggesting at the same time that the ideal designer combines the qualifications of the graphic designer, the information architect, the programmer and the usability engineer. This concept does not gel with Bolter's understanding (2001, p. 52) of the graphic designer in the artistic tradition of the avant-garde who treats words pictorially. This notion of the painter with words also reflects in the self-image of some of the designers of the 1990s. Siegel, Gabo, Carson and Brody all approached their respective media as a canvas on which images and text mix and conflate.

The Web, as it has been shown, is a medium for *writing* with alphabetic symbols and not primarily a surface for *painting* with images and with words as Bolter assumes. As a consequence, if one wants to examine the creative potential of such an environment, it makes sense to look at writing rather than painting as a source of inspiration. This is not to say that the web designer should not ideally have a very good

eye and a deep understanding of formal visual design. But the visual aesthetics of the text come at the end of a complex and intense process of organising the movements and permutations and combination of text and other data. Those other data can be movies and images but they will most likely be surrounded by texts which categorize, discuss and criticize the image. From this perspective, it will be suggested that a fitting metaphor for the creative designer in the context of the Web is that of a poet, an experimenter, whose material is text. Why is it necessary to propose such an analogy? Chapter three has explained how new concepts can only be expressed in the form of metaphorical transfer. One of the problems which some graphic designers faced in the 1990s was that they transferred their understanding of design for print to a new medium which works in a totally different context. Based on what has been argued in this thesis so far, when it comes to the design for digital data networks, the metaphor of the artist painter is misguiding. The poet who is to be proposed as a model for the designer in the context of digital data networks and databases is one who uses text and other data as his creative material. The properties of his material go beyond formal visual aesthetics. They are best described in the terminology suggested by Aarseth (1997) in his *Cybertext*, who comes up with notions like *dynamics*, describing the possible changes in the amount and content of text elements or *determinability* as a way of looking at the flexibility in the relationship of the text elements to each other. Other properties of text, according to Aarseth, are *transiency* or the ability of a text to change without the user's intervention. *Access* focuses on how much of the text is accessible at any given time?[143] The poet designer combines, arranges, edits and juxtaposes text and other data. He is not so much interested in a fixed visual layout but in a constellation of text in the sense of a concrete poem which concentrates on the relationship between sign, signification and surface. This constellation itself is one which incessantly shifts according to the status of the databases it feeds from. It should be remembered however, that a metaphor is a conceptual image which helps to understand certain aspects of a concept but it is not an exact description. Accordingly, the metaphor of the designer as a poet is to be understood as a way of rethinking the profession and not as a detailed recipe for action.

In the following, the work of a few artists and designers is presented in order to further illustrate the creative power lying in this specific understanding of design for digital networks. The work discussed does not only relate to data networks. It aims to

[143] See also chapter 2.9

give a wider overview of how a new generation of designers and artists approach digital media.

Christophe Bruno[144] calls some of his work Google art as he exploits the Google search algorithm for his own artistic purposes. His piece *Gogolchat (*2002) is a chat with an imaginative robot named Gogol. It carries some reference to the earlier mentioned Eliza (see chapter 4), a supposedly intelligent piece of software, which would involve itself into text-based dialogues with a user. But while the responses of Eliza were modelled after a psychotherapeutic interview technique, Gogolchat pulls its answers from the Web via Google searches:

> Gogolchat is a bot[145] whose dialogue is gathered from web texts. It actually responds to what you write, but with dialogue gathered from the web - and so it takes on the web's "personality." One finds oneself in the familiar Eliza-patient situation: asking Gogolchat questions, expecting sterile, generic, occasionally logical AI responses incorporating one's questions. But the web isn't written by an algorithm; it's written by humans. Still, on the web, humans often don't write quite humanly; Gogolchat's dialect is definitely webspeak. (Alexander, 2003)

Another piece by Bruno is *Dreamlogs* (2005) (figure 63). With Dreamlogs, the user, in a half random, half conscious way navigates his way through texts offered to him by a search engine. Later on at the end of the session this process is rendered into a website in the form of a blog. Bruno's work is multilayered and plays on many aspects of computing and language. On one hand he deals with questions of semantics. How does meaning, for instance, arise from a random choice of texts? On the other hand the work is a reflection on the earlier mentioned statement that everything exists to end up in a database. Even the most circumstantial chat or forum entry is registered by Google bots nowadays. Bruno samples these everyday texts, using them as a resource for his algorithmic cut-ups. Thus, he programmes new contexts into Google's database. But Bruno's reflections do not simply remain on a linguistic level. Behind this lies the bigger question of how data are utilized and how Google reflects a change in power structures. Whilst on first impressions, Google is simply another search engine,

144 <http://www.iterature.com>

145 'A bot (short for "robot") is a program that operates as an agent for a user or another program or simulates a human activity. On the Internet, the most ubiquitous bots are the programs, also called *spiders* or *crawlers*, that access Web sites and gather their content for search engine indexes.' ('bot', <http://www.whatis.com>)

re 63: A piece of Google art by Christophe Bruno called *Dreamlogs*.

o (<http://www.iterature.com/dreamlogs/faq.php>) describes the piece as follows: 'Dreamlogs produce streams of associations on the Web. Starting from a discursive position you can for instance try to reach the opposite discursive ion within a number of steps. To do so, choose a word or a piece of sentence as a starting point: "I love life", "I'm sad", whatever you want (it works better with a simple one). When you press "Go", the program searches related text frag- ts among all the texts containing the input. Then choose another word or sentence among the texts displayed (by click- n it) and reiterate the process. At the end, save your journey through the space of discourse and you will see the dream- hat has been generated.' The more or less random combination of text and images produced during this process ars like the subconscious flow created by a dream.

ge source: screenshot from http://www.iterature.com/dreamlogs/)

it has actually, over a few years, moved into a position where it almost controls the Web. Algorithms often decide whether a text is recognized or not. Bruno's piece *Google AdWords Happening (*2002) highlights the fact of Google's dominance by showing how the company has even been able to put a price on words[146]. This kind of artistic intervention emphasises the fact that the medium Internet has produced a very unique environment which treats text totally different than printed matter does, opening up totally new possibilities for abuse but also for creative work.

The early days of the Web saw a lot of big companies enter the new medium and designers like Siegel (1996) advised their designers about how to build 'killer websites'. The Web 2.0 is not so much about individual websites any more but increasingly about social networks and the earlier mentioned 'harnessing of collective intelligence' (O'Reilly, 2005). In the old economy of the physical world, media companies and other businesses would make assumptions about their customers based on market research and sales figures. Accordingly, they would try to set up their product range and sell their products. The big players on the Web 2.0 work differently. They just provide a framework for a specific interaction to happen.

> eBay's product is the collective activity of all its users; like the web itself, eBay grows organically in response to user activity, and the company's role is as an enabler of a context in which that user activity can happen. (O'Reilly, 2005)

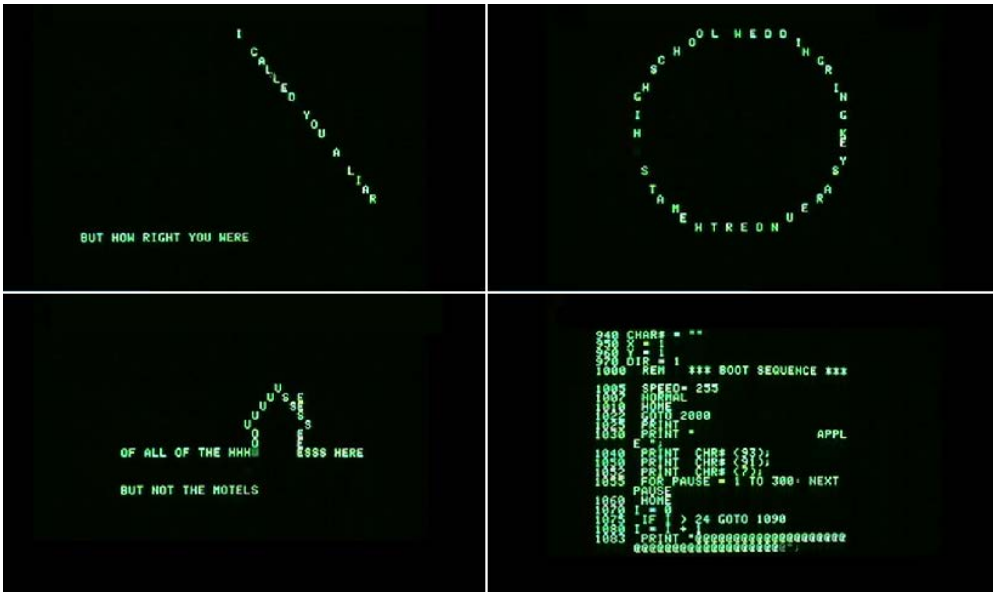
But the enablement of the user does not only happen in order to sell products and services. Collaborative efforts are omnipresent. Wikipedia, the online encyclopaedia, is solely written by volunteers. More or less anyone can edit or add any articles. Even though the credibility of Wikipedia has been questioned more than once recently (Lanier, 2006), this communal project attracts roughly 450 times the daily traffic of the online version of the Encyclopaedia Britannica, as Wikpedia itself claims (en.wikipedia.org/wiki/Encyclopædia_Britannica) with reference to the traffic comparison tool on the Alexa[147] website and, in the six years since its launch, it has reached the top ten worldwide with regards to traffic. The Web is dominated by companies and projects such as Google, Wikipedia and Facebook which have a superior approach towards gathering, analysing, combining and disseminating data. The design of the flow

146 'AdWords is an advertising tool which allows advertisers to link their website to specific search terms. As specific search terms are more popular than others, prices for adWords differ from word to word.' (<https://adwords.google.com/>)

147 <http://www.alexa.com>

of these data, as in Bruno's work, is a creatively very challenging task. Again, this goes to show that the designer's job, in this context, is not so much about painting with words or about visual expression in general: it is more about the relationships between texts, about databases, the flow of data and how semantics can be supported by code.

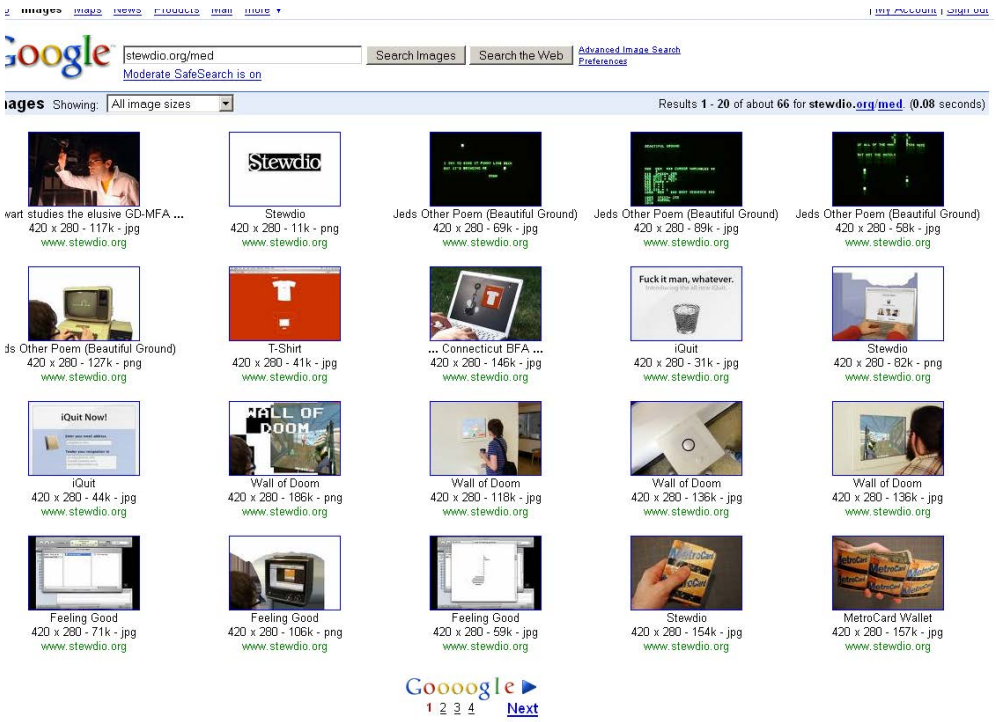
Stewart Smith is another designer and artist who will be introduced here. Even though still at the beginning of his career, he has built up an interesting portfolio and has won some accolade particularly for his piece *Jed's Other Poem* (2005), which was shown at various festivals. Smith, together with Jeff Bernier, produced this work as an unsolicited video clip for a homonymous song by the band *Granddaddy*. The clip was later adopted by the band as their official video (figure 64). The song is about a robot which writes poems. The video is solely text-based, with green monospace type moving on a black screen. Sometimes the lyrics are simply typed out in sync with the singer's voice and sometimes the cursor blinks and moves around emphasising the rhythm while other lines of text develop into little drawings, illustrating the lyrics. At first sight, and despite the fact that the text performs beautifully together with the music, this looks like a moving version of a visual poem more in the fashion of the avant-garde than of concrete poetry; drawing with letters rather than scrutinizing text as a medium. But Smith's piece is not as obvious as it seems. While the video was finished in 2005, it was programmed and performed with 25 year old technology, an Apple Computer from 1979 and Applesoft II, a version of the programming language BASIC. As with almost any computing at that time, the command line interface was the main mode of interaction. Not only was Jed's Other Poem programmed in that way, the whole of Smith's video itself skilfully plays with allusions to coding and data processing. The video is a constant movement back and forth between an old fashioned computer, processing line by line, and sudden outbursts in which the cursor and letters, suddenly coming to life, defy the limitations set by the monotonous act of adding 0s and 1s. The lyrics are about a home-made robot which writes poems and so Smith's video is an illustration of the old dream of inanimate matter suddenly coming to life. Very cunningly, Smith destroys this myth at the end when the music fades out. The same code, which had just, seconds before, produced the illusion of a primitive but emotive robot, now prints out, endlessly, line by line to remind the viewer that it was just that: an illusion produced by an endless flow of inherently meaningless alphanumeric symbols. This little piece shows a strong awareness of the relationship between programming and writing. In modernist fashion, but with a hint of postmodern irony,



```
940 CHAR$ = ""
950 X = 1
960 Y = 1
970 DIR = 1
1000  REM   *** BOOT SEQUENCE ***
1005  SPEED= 255
1007  NORMAL
1010  HOME
1012  GOTO 2000
1025  PRINT
1030  PRINT "                    APPL
E ";
1040  PRINT  CHR$ (93);
1050  PRINT  CHR$ (91);
1052  PRINT  CHR$ (7);
1055  FOR PAUSE = 1 TO 300: NEXT
PAUSE
1060  HOME
1070 I = 0
1075  IF I > 24 GOTO 1090
1080 I = I + 1
1083  PRINT "@@@@@@@@@@@@@@@@@@@@@
@@@@@@@@@@@@@@@@@@@@";
```

ure 64: Screenshots from Stewart Smith’s (2005) video clip to the song *Jed’s Other Poem* by the band Granddaddy. This e is more than an ostensible play with animated type which one might find quite commonly in Flash animations. It is a ewd comment on the relationship between text and code.

age source: screenshots from <http://www.stewdio.org/jed/>)



ıre 65: What looks like a result page from the Google image search is actually another piece by the designer Stewart th. In the explanation to this site, he explains that he was using a new service by Google called Google Portfolio to or-ize his online portfolio (Smith, 2007b). This new service would give the designer and artist the chance to simply pull ·ther images and links relating to his work into the results of a Google image search. Smith later revealed that what ns like an elegant concept was actually a hoax. This project illustrates that contemporary web designers need a very ıiled and intimate knowledge of how data are organized and how they flow through the Web. This kind of knowledge ɔmes increasingly relevant. The project itself is no longer online.)

age source: screenshot from <http://www.stewdio.org/index.html?project=googleshowcase>)

Smith lays bare the means of the process which has lead to the outcome, just as he (Smith, 2007a) proclaims in his groundhog manifesto: 'Great designs should reveal their mode of production and the thinking behind it'.

Another piece which illustrates Smith's awareness and understanding of his means of production is his recent portfolio which ran up to October 2007. Smith (2007b) claimed that this portfolio site was using a new Google service called *Google Portfolio* (figure 65), which would use the Google image search as an interface for an artist portfolio:

> For over a year this was the official Stewdio portfolio Web site. It didn't just emulate Google, it *was* Google. A redirection script allowed the search giant's bots to spider Stewdio.org while regular users were immediately forwarded to http://images.google.com/images?q=inurl%3Astewdio.org%2Fmedia%2F. Subsequent internal pages constituted a hoax called "Google Showcase (Beta)." The hoax claimed to be an official Google web application for displaying an artist portfolio and participation was by invite only. Over the course of maintaining Google Showcase several visitors sent emails inquiring about the service. (Smith, 2007b) [148]

The fact that such a hoax has its audience is due to the growing sense that services like Google are inherently ruling the Web with their algorithms. There is a certain geeky elegance behind the idea that Google automatically compiles a portfolio from one's content floating around in the Web. The hoax's attraction lies in the fact that the perception of the Web is slowly shifting. The metaphor of websites as a place or a collection of pages is increasingly imprecise and will, to some extent, have to make way for the idea of the Web as a space through which data flows.

Steward Smith says that his projects often 'consist of re-thinking interfaces', some of which he combines with a certain subversive humour as in the case where he adds Google AdSense adverts to the Yale School of Art wiki to supplement his own pocket-money (Smith, 2007b) [149]. But Smith is not simply a prankster. He has worked

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148 Smith has taken his Google portfolio offline.

149 Smith's (2007b) comment on his project *Yale AdSense* : 'Frustrated with my financial situation, I inserted Google Ads into the Yale School of Art wiki. The ads have appeared on the home page, Financial Aid page, and various other locations. I occasionally receive hate mail from fellow students and the ads have been removed without my consent several times. The adverts are sometimes captioned with the phrase "Yale's website will pay for my student loans." On a busy day the home page adverts can make me approximately six dollars richer.'

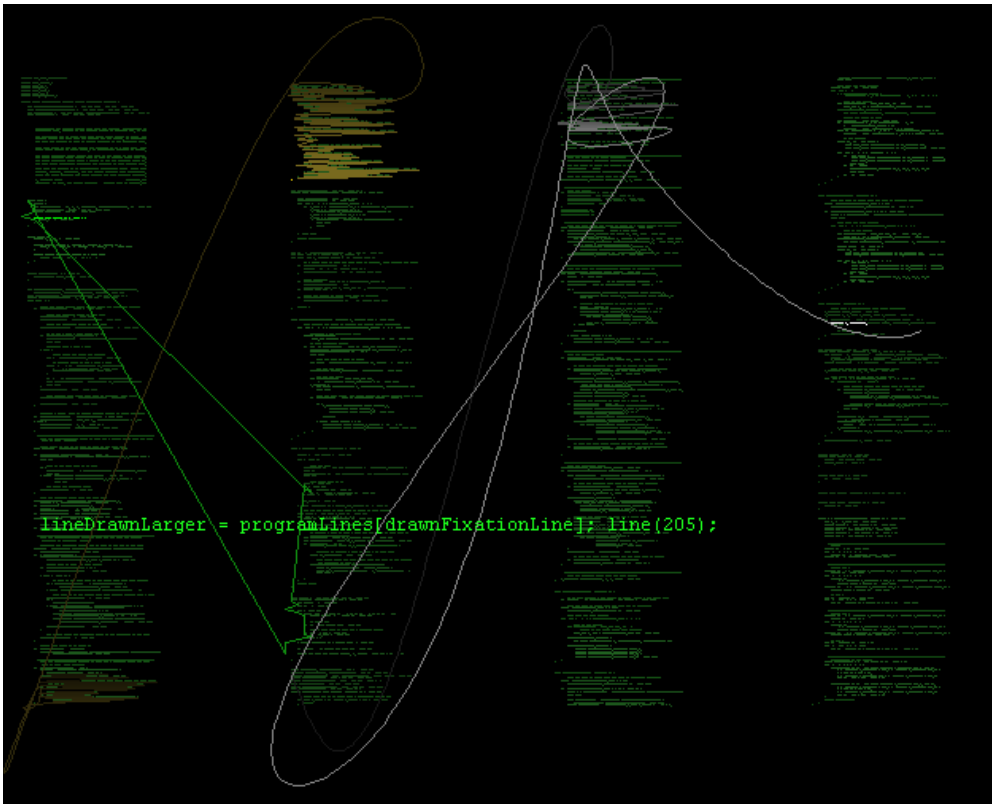
as a designer in a commercial context, one of his clients being the MIT Centre for Advanced Visual Studies (Smith 2007c). Smith is also a writer. In 1997 he has started Tweed for popular culture (Smith 2007d), his own magazine – online and in print – and he has also done a project on Haikus (Smith 2005). Thus, Smith's understanding of web design is not primarily based on visual design practice. It is grounded in his understanding of language as a source for narrative, poetry and programming.

Ben Fry is another artist and designer who combines an interest for literature and programming with design practice:

> I'm interested in building systems that create visual constructions from large bodies of information. The methods used in designing static chunks of data: charting, graphing, sorting and the rest... are well understood, but much interesting work remains in finding models and representations for examining dynamic sources of data, or very very large data sets. For this work, I'm employing behavioral methods and distributed systems which treat individual pieces of information as elements in an environment that produce a representation based on their interactions (Fry, 1999)

One of Fry's key works is *Valence* (1999) (figure 66), a software which visually analyses the structure of prose. Valence investigates a text in relation to the frequency and proximity of words. During that process, it draws a three-dimensional map which visualises these relationships. The map itself constantly changes and shifts as long as text is fed to the software. Thus, a book like *The Innocents Abroad* by Mark Twain turns into a database to which Valence delivers a constantly shifting interface. This contradicts the idea of digital data as merely a new form of displaying information with the monitor as its canvas, a view which undervalues the potential of computing and networking. Data networks have the ability to constantly analyse and recontextualise information. The screen is a mere snapshot. As shown in chapter five, the merger of text and image in digital media produces a fixed entity which detaches and isolates the data from the database as well as from further processes of digital analysis. The constant shift in relationships between data can be described as a movement. And movement plays a great role in Fry's piece but it is very different from the movement which can be seen in Flash animations such as Gabo's website from 1997. While Gabo turns letters and sentences into animated little cartoons, which play out their more or

ure 66: A screenshot of Ben Fry's *Valence*. The designer (1999) writes about this work: 'The image on this page is taken m a visualization of the contents of the book "The Innocents Abroad" by Mark Twain. The program reads the book in a ear fashion, dynamically adding each word into three-dimensional space. The more frequently particular words are nd, they make their way towards the outside (so that they can be more easily seen), subsequently pushing less commonly d words to the center. Each time two words are found adjacent in the text, they experience a force of attraction that ves them closer together in the visual model. The result is a visualization that changes over time as it responds to the a being fed to it. Instead of less useful numeric information (i.e. how many times the word 'the' appeared), the piece vides a qualitative feel for the perturbations in the data, in this case being the different types of words and language ng used throughout the book.' (Image source: screenshot from <http://benfry.com/valence//applet/>)



ıre 67: Paley's *Code Profiles* is a cunning but at the same time subtle comment on the relationship between human lable text and code.(Image source: screenshot from <http://artport.whitney.org/commissions/codedoc/Paley/Codefiles_800x600.htm>)

less predictable scripts according to the Flash timeline, Valence shows the true nature of movement of data. It is not a movement through time or along well scripted narratives but along certain trajectories of possible data constellations.

With *TextArc*, Bradford Paley has produced a piece which has a lot in common with Ben Fry's Valence as it can be used to analyse prose and to reflect on the relationships between words. Another work by the designer and artist Paley, investigating the condition of text in digital media, is *Code Profiles* (2001) (Figure 67). It is nothing more than a piece of code which runs over a screen in four columns. The code though, performs a self-reflective routine by highlighting several forms of reading the code. The first reading runs through the code by highlighting it as if reading a prose from top left to bottom right. The second process of reading is a more erratic act of highlighting which follows the order in which the code was conceptualized and written by the programmer. The third reading successively highlights the bits of code which are currently operating. In this case, the code does not operate from the background, giving instructions for the performance to be seen on the screen. In this case, similar as in Jed's Other Poem, the code *is* the performance. This again delivers an interesting parallel to concrete art which does not want to reference or even to abstract something, so much as it is simply pointing at itself. And to make its point properly, it needs to be bare, void of all adornments, revealing the nuts and bolts of the relationship between the word and semantics. The visual impact and the irritation caused by the interruption of the traditional flow of the text is a side effect of concrete *constellations* and not necessarily their final aim (Denker cited in Weiss, 1996).

6.7 Conclusion

Hypertext is not as hypertext theory wants to make believe, a way to break up the restrictive nature of narrative prose. The Web, like all texts, is a mix of narrative and taxonomies. Taxonomies emphasize the synchronous, comparative properties of language and thus, reveal the true nature of text: a texture which runs both ways, from the past into the future while at the same time synchronous and self-reflective. As Glazier points out, poetry therefore has always been a research lab for language, working to explore and extend its possibilities. In its written form, this kind of experimentation necessarily leads to topographic writing at some point. But topographic writing is complementing narrative rather than replacing it. Nor does topographic writing necessarily dissolve into images as the visual poetry of Apollinaire and Marinetti might sug-

gest and as Glazier and Bolter seem to believe. Just like the change of rhythm and tone can give the spoken language a different meaning, two-dimensional layout and subtle text-decoration can influence the semantic emphasis of a text without having to fall back on illustrative and onomatopoeic techniques. Thus, the idea that from topographic writing the text dissolves into images cannot be upheld.

A lot of content on the Web is text in the form of prose, side by side with other content such as images and movies. All this content is increasingly organized and analyzed via navigation or in other words, taxonomies. Programming as another form of text has now added to it the power to automatically process other texts, to further analyze, rearrange and recombine content. But programming does not only work in the background. It comes to the fore by adding functionality to text such as links. A link is not simply like turning a page. It is not a link between two existing text entities. In a database driven website, and particularly in complex content management systems a link initiates several programmed functions and leads to the on-the-fly compilation and rendering of a new page. This functionality has to be visually embedded into the text and is most often done via some sort of text-decoration. Visual conventions for embedding links have slowly emerged which at the same time further restrict the possibilities of typographic experimentation. Accordingly, the Web2.0, as a place which facilitates the flow of data, is a typographically rather restrained environment. All this evidence suggests that it makes sense to look at the web designer not as a painter but as a writer, a poet, an organizer and researcher of words and texts who is more interested in exploiting the creative potential of organizing this flow rather than freezing it in expressive imagery.

7.0 CONCLUSION

7.1 Research Question: Text and Image in the Context of Digital Writing and Design

This thesis set out to answer the question whether it is the case that digital writing and particularly the Web support an iconic turn in the sense that writing departs from alphabetic text towards image writing or some form of fusion of symbolic and pictorial representation, as theorists like Bolter and Glazier and to some extend Landow suggest. Are there signs on the Web that the written word unravels and melts into images or that alphabetic writing is increasingly interspersed with ideogrammes and pictogrammes? Is the written word in digital media getting more and more expressive to the point that it merges with images or is it that writing is simply replaced by images?

These issues are inextricably linked to the design profession and its role in the way information is formed and displayed. This is underlined by Bolter (2001) who calls on the designers Siegel and Carson as witnesses in order to prove the inevitability of a strong iconic turn. Accordingly a further research questions arises, regarding the role of the designer in the context of the Web and its rapidly changing information interfaces. It is merely the question of the designer's influence in how those interfaces evolve and what exactly his function is in the context of the Web as it emerged during the last ten years.

With regards to the first question it is the contribution of this research to show that the current state of the Web does not give any indication that the Western world is digressing from alphabetic writing, nor that image and text are merging. Chapter five demonstrates that the aesthetics of early commercial websites were dominated by web-cum-print designers who extended their ideas of print design to digital media. Accordingly, the believe of theorists such as Glazier, Bolter and Blackwell that those early websites were indicating an imminent strong iconic turn were misguided. During recent years, and particularly through the effects of social networking, also dubbed as Web2.0, the Web's reliance on text-based semantics has been reinforced. Chapter four explains, that it is certainly not the case that the written word, based on the alphabet, is fighting rearguard actions, that it is a beleaguered medium. Digital media, and the Web in particular, are constantly producing new formats and sub-formats of existing forms of text-based communication: blogs, instant messaging, forums or simply mix-forms such as Facebook to name only a few. Text has even found its way into media

originally reserved for communication with much higher bandwidth such as the mobile phone.

The fact that in the recent years more and more images, movies and audio files have become accessible through the Web does not necessarily support notions of a strong iconic turn. The Web is actually a remediation of many other media (Bolter & Grusin, 2000). A news website like CNN, for instance, is a remediation of the newspaper and the TV merging both into one screen. Chapter five, using case studies such as the evolution of the layout of the *Guardian Online,* shows that the Web moves towards a clear visual separation between text on one side and movie and images on the other side. This is because text, image and moving image are all valid media in their own right, all with their specific qualities, serving specific purposes. Text, as Flusser (2003) has pointed out, was the medium invented to criticize the image, a job, which is still relevant in the digital age. Chapters two and three explain why on the Web, images and movies are often surrounded and complemented by type. This is because alphabetic text explains, discusses and categorizes imagery. Text is what gives structure to images and movies just like language in general gives structure to the world.

The second issue, regarding the role of the designer, has been answered in a similar decisive way. Particularly Bolter interprets certain tendencies in 1990s print design and early webdesign as a prefix towards a strong emphasis on images and the disintegration of alphabetic writing. Chapter five gives evidence that this extrapolation was actually a misinterpretation of both the role of graphic design and the designer in the context of interface development. The role of the graphic designer has changed. Rather than organising entities of information on a two-dimensional surface, which reflects the painter's interaction with a canvas, the designer in the context of the Web has to organise flows of information. As a result chapter six highlights that new metaphors are needed to explain this new role and the relating visions with regards to the design of electronic writing media.

7.2 Findings I: Misconceptions About Digital Writing

The first contribution of this thesis is a detailed analysis of the various preconceptions with regards to the history and function of both text and image that underlie the notions of a strong iconic turn in electronic writing. Bolter (2001) and Glazier (2002) for example base their arguments on the idea that there is a kind of chronological development in which text at some point replaced the image as a form of narrative writing.

Hypertext is seen as a further development but neither Bolter nor Glazier can explain why digital media should suddenly provoke a u-turn back to the image. Chapter three of this thesis shows that the alphabetic text is much more efficient than images or forms of image writing when it comes to storing long texts. And efficiency is an important aspect of hypertext theory. The hyperlink is certainly a much more efficient way of connecting texts than a physical library or to put it in the words of hypertext theory, the link is much more efficient in exposing the intertextuality of various texts. However, whilst alphabetic writing compresses language into a code of twenty-six discrete symbols, the image adds information and thus it is not the right answer to any questions relating to information overload.

Chapter three points out that images and icons are very good at depicting things or even concepts and emotions but they are less effective when it comes to conveying human language in a precise manner. Humanity is still capitalizing on text's greatest strengths as a form of language-based communication that transcends time and distance. The alphabet is an extremely precise and highly compressed code, which can exactly convey language from the writer to the reader. And it also differs from other forms of storing language such as video and sound recordings in that it is actually *not* linear but laid out on a surface and thus the choice of the point of entrance into the text is totally up to the reader.

In the same chapter another misconception about new forms of writing is highlighted, which relates to the acceleration of media, first through printing and then through electronic media. It refers to the question whether and how humans cope with the rapid increase of information. One of the ideas implicit in Bolter's and Landow's work is that information overload should be overcome by computers. Hypertext as a medium was supposed to create some mysterious form of new reading in which meaning would emerge from the text without any human effort (Winkler, 1997). However, if like Bolter and Glazier one believes in the 'deep understanding that can be put into images – but are difficult to put into words' (Stephens, 1998, p. 2) it is only consequent that the image should also play a huge role when it comes to dealing with information overload. Chapter three explains how these assumptions form an expression of metaphysical hope rather than a realistic answer to the acceleration of media production.

A further preconception about alphabetic writing, which is very common and reflects in the writings of Landow (2006) and Bolter (2001), is the idea that alphabetic writing is predominantly concerned with narrative. Chapter two shows that the origins of writing are most likely as much born from the need for keeping accounts, a usage of

language not related to the linear flow of narrative at all. Accounting is more about the 'classificatory nature of writing' that Hobart and Schiffman see in language. Classification is about comparison and thus a form of language, which turns the attention towards itself, towards words and their relationship rather than to the images they contain. The thesis draws from Hobart and Schiffman (1998), who argue convincingly that writing actually frees language from the flow of time and thus, gives humans the possibility to indulge in their passion for classification. On a similar note, Aarseth (1997) is quoted, who convincingly rejects the idea that the codex is necessarily linear. This is why in chapter five this thesis turns to poetry as an alternative concept of dealing with text. Poetry turns the attention away from the chronological aspects of the spoken word towards topographic and synchronous aspects. Text in this respect is texture and does not simply flow one way.

With widespread broadband access, large amounts of images and moving images are uploaded to the Web everyday. The same though, can be said about text. When it comes to categorization, analysis and criticism of the world and the images humans make of it, text is still an extremely valuable medium. It is increasingly assisted in these tasks by computing. Whether computers will one day be able to relieve humans from the task of extracting meaning from text and images is a different debate. However, currently it seems that instead of favouring images and iconic writing digital media prove to be a huge catalyst for new forms of alphabetic writing.

7.3 Findings II: The Role of the Designer Redefined

The second major contribution of this thesis is to provide the missing link between the discussion surrounding electronic writing, which is to a large extent grounded in literary theory and philosophy, with the field of interface and interaction design. Bolter's and Glazier's references, even though pointing at the design of digital media, are rooted strongly in print design. The ideal of the graphic designer as a painter with words as it is supposed by Bolter and Blackwell, might as well be a good analogy to describe the creative potential which lies in the design of static print pages. It might even refer to the design of stand-alone applications for digital media where the designer can concentrate on the illustrative aspect of text and image. But overall, the painting-with-words analogy does not fit the creative landscape of digital networked media, which offers itself to the contemporary graphic designer. This thesis shows that the design of networked digital applications has opened up a whole new field of creativity, which

goes beyond the mere visual organisation and formal aesthetic treatment of text. Current web design is about designing the flow of text and data in general as well as about designing specific interactions. The positioning and organisation of text and image on a website is not simply framed by the available content and the space itself any longer but by far more complex relationships designed on a database level.

New job descriptions have emerged, such as information architect and interaction designer, clearly indicating that the design of digital information asks for a new set of skills. Interface design for networked digital media or rather for databases, adds a great deal of complexity to the graphic designer's job. Designers and artists like Stewart Smith, Christophe Bruno, Bradford Paley, Ben Fry and many others, are the avant-garde of a new breed of creatives who could be described as poets rather than as painters. Poetry delivers the more suitable metaphor because those artists and designers are interested in semantic structures and relationships rather than in two-dimensional arrangements. The Web is more about intricate and complex data constellations than about visual statements. It is not a domain of clearly defined content arranged in a clearly defined space. The Web is a medium in which the content of databases is constantly remixed and visualised in very impermanent forms.

Designers will most likely remain to experiment with visual codes. And it is also certain that language and its particular visual code, alphabetic text, will not stand still but will develop further over the common decades and centuries. The question though is how much of these developments will be formed and controlled by graphic designers. The Web is the first true many-to-many publishing medium. Central control over the content, as well as the usage of language and writing as it was exercised during the heyday of printing and centralized media, does not exist any longer. Anyone can publish whatever he wants and without consideration of spelling. Probably never before in human history has so much everyday conversation been transferred into alphabetic symbols than at the current time. This development will definitely have an influence on the further evolution of the written word. Therefore it will at least be as much an evolutionary bottom up development rather than one that is dictated from top down.

While spelling, grammar and words have changed dramatically over hundreds of years, the basic alphabetic code has remained astonishingly stable. Mobile text messaging is a domain where text has undergone huge modifications during the recent years in a bottom-up development. Due to the inefficient text interface of the mobile phone, users have developed what is called SMS speak or chat speak, an abbreviated

form of written language. If anything, it shows that the evolution of written language might favour simplification and omission over adding visual complexity.

On a final note it should be also mentioned that design education is very much affected by these developments and not only when it comes to interface design. The ubiquity of digital media makes it more and more difficult to maintain the division between an education for print design and one for the design of digital media. Accordingly educational institutions must become aware of the paradigm change that sees design moving away from the two-dimensional layout towards a form of design that combines streams of data. This is even more important as design education increasingly has to emphasise aspects of research. The relevant fields of design research can only be defined if there is a good understanding of the technological underpinnings of information technologies and their impact on contemporary culture.

7.4 Implications for Future Research

This thesis has described changes in media interfaces and the role of their designers which is just one aspect of a huge shift in literacies that is currently taking place and which opens up a great amount of research opportunities. There are some predictions about how future literacies will develop. Flusser (2003) for example argues that 'people have reached what they have aimed for since the beginning of humanity: the digital code is the perfect method to change the world to ones heart's content' [150] (ibid). This, continues Flusser, will make common literacy redundant (ibid). Nadin (1997) agrees that humanity will be faced with a decline in traditional literacy. In this respect, the study of the American National Endowment for the Arts (NEA) called *To Read or Not to Read* (NEA, 2007), which was published at the end of 2007, is of great interest. The study recognizes that both adults and kids are reading fewer books and from that it assumes that reading is in general decline. Author Steven Johnson, who had a closer look at the study, criticizes the study for excluding screen-based reading from the data (2008):

[150] Translation by author. German original: 'Dadurch haben die Leute das Ziel erreicht, wonach sie seit Beginn der Menschheit strebten: Der digitale Code ist die perfekte Methode, die Welt nach Herzenswunsch zu verändern. '

> Yes we are reading in smaller bites on the screen, often switching back and forth between applications as we do it. A recent study by the British Library of on-screen research activities[151] found that "new forms of 'reading' are emerging as users 'power browse'"

Johnson (ibid) backs this up further with the remark that the NEA study claims there has been a decline in reading while at the same time it shows that prose literacy levels have not changed significantly. Johnson concludes that for the time being humanity is faced with rapidly changing literacies rather than a huge decline in general literacy. It is most likely that digital media will increasingly trigger new forms of text usage and thus, new forms of reading. It is also most likely that alphabetic text will be further enhanced with the help of programming. Most digital text is already located in some databases and can be manipulated, rearranged and contextualized with the help of software. Another main factor is social networking, which is increasingly adding new facets to the usage of writing as a social and collaborative activity. Social networks are domains, which have the need for both, the accuracy of text when it comes to transferring and storing conversations and the directness and visual richness of the image. As this research has described in detail, the tendency of digital media is to juxtapose these two domains rather than to merge them. It will be interesting to see how this relationship develops over the next years and particularly in virtual worlds such as Second Life where currently most conversation is text-based and superimposed onto the rendered 3D environment.

Overall, research with regards to changing reading and writing habits is slowly gaining momentum, of which the two above mentioned studies give an example. The earlier mentioned work by anthropologist Stefana Broadbent (2007) on changing media usage is another one. There are other very interesting research projects looking at changing literacies from the viewpoint of writing media, such as the *Transliteracy* group at deMontfort University and *The Future of the Book* think tank which is situated in Brooklyn and London. Both research labs are investigating how writing might develop across various media.

Another important aspect of changing literacies are cultural idiosyncrasies when it comes to developing new writing and reading formats. Japan, for example, has embraced the mobile phone novel:

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151 Both the British Library Study and the NEA were published at a time when this thesis was already close to completion.

> Once seen as a passing fad, the cellphone novel, or ketai novel, has wormed its way into the heart of Japanese popular culture. Half of last year's top-10 bestselling novels originated from the (very) small screen and the top three books were all written by novice cellphone authors. (The Independent, 2008)

There lies a lot of possibility for cross-cultural research in the question why specific text formats develop in specific cultural environments. On a slightly different note, it would also be of interest to further investigate and compare how different writing systems such as the Chinese or Japanese cope with the ever-changing digital landscape. It would be of particular interest to see how the contemporary programming structures and database systems, which are fundamentally based on alphabetic language, deal with syllabic and other more complex writing systems and how this feeds back into the culture of writing and reading.

These various focus points do not relate to abstract problems. Digital, networked writing has become a phenomenon, which affects each and everyone. In developed countries information management comprises a huge part of the GDP and thus media-specific literacy becomes an increasingly pivotal skill for the survival in such an environment. This thesis is part of a young field of research, which aims at describing and understanding this revolution in literacy both on a theoretical level, but also in its practical implications.

EPILOGUE: WRITING AS PRACTICE

The process of writing this thesis, as well as the experimentation with other forms of writing in the studio, has changed its author's perspective on text. Of great importance was the experience that writing itself provokes thoughts and creates the text. One can have quite a clear idea of what to write, one can write endless structures and outlines but when it comes to the detailed writing of the text, the process takes on its own dynamic. Thus, the expression of *writing up* a thesis, at least in this case, seems totally out of place. Writing is a way of thinking, not something that one does at the end. This is not to say though, that the medium text in any deterministic way dictates the message. In a religious context, a medium is a person who, in a state of trance and often drug induced, develops an access to a different level of consciousness. This can well be transferred to the context of the writing process and writing media, in the sense that when the medium becomes transparent, when it turns into an extension of man so to say, the writer himself develops a different state of mind in which he can express himself differently. At least, that is the personal experience of the author of this thesis.

Another defining point is definitely the first hand experience of intertextuality which comes with such a piece. A thesis delivers a very obvious example of intertextuality as the argument claws its way along various sources, quotes, case studies and examples. This is the case even more so when the thesis is a reflection on the matter of text. In no way though, has the experience of intertextuality made the writer feel anything less than an author. The question is what one means by the term authorship. Language and words certainly do not belong to an individual but are common property. What reflects in spoken and written language is a certain view of the world. And this in itself contains a moment of authorship. What the work of Maturana, Varela, Damasio and others has shown is that when man looks at the world he does not see it but he imagines it and, in a further step, through the usage of language and text, he describes it. Both the imagination and description do not resemble the world, they create it.

The process of writing a text like this is everything else other than linear. It is more a circular, iterative movement. This thesis, as a whole, has seen two major drafts and several minor revisions; not taking into account the permanent circling that takes place when letters, words, sentences and paragraphs are constantly rewritten during the actual process of producing the text. Digital word processing lends itself perfectly to such an approach by allowing for total flexibility and instant changeability of each

single letter. This underlines the preliminary nature, particularly of digital text. With handwritten or typed text, the correction is a menace, an obvious and visual interruption of the annotated train of thoughts. In some way, the material stems itself against the writer. The author might better consider well what he wants to write beforehand. But the gratification which lies in print is the promise that the manifestation of the text on paper will carry the author's words beyond his own lifespan. The digital text by contrast is just a very fluent state which constantly provokes the author to revise his own writing. The ease with which digital text can be edited makes it difficult to find an end.

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APPENDIX I:
DESCRIPTION OF STUDIO WORK

Project 1: The Lost Cosmonaut

This project was the result of an artist residency as part of the Artists in Labs programme organised and initiated by Professor Jill Scott from the Zurich University of the Arts (HGKZ). The residency took place in the GlobIS lab of the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland.

The Lost Cosmonaut is a storytelling project which makes use of digitally enhanced paper (figure 68). The latter is a technology which is based on plain paper printed with a fine irregular grid. This grid represents a coordinate system that can be detected via an electronic pen. Such a pen contains a tiny camera next to its ballpoint tip which reads the grid. Thus, the pen, with the help of an internal processor, constantly detects its position on the paper. Via Bluetooth, this information is then passed on to a PC. This turns basic paper into an interface for the computer which opens up a vast amount of possibilities for interaction. Not only can handwritten text be sent to the computer, but in the reverse direction, digital events such as movies, images and sounds can be connected to the paper and triggered via the pen. Specific areas can be mapped out on the paper which, when touched with the pen can theoretically call any kinds of events which can be digitally controlled. While the basic technology has been developed by the Swedish company Anoto, the GlobIS lab has over recent years developed an infrastructure that allows for the combination of digitally enhanced paper with various media such as movies, images, sounds, Office and Web documents.

The idea was, together with the playwright Andrea Lioy and the researcher Beat Signer from the GlobIS lab at the ETH and his colleagues, to investigate digitally enhanced paper as a tool for an interactive narrative environment. The basic storyline is that of a cosmonaut drifting in orbit with no contact to earth, reminiscing about his life and the beloved ones left behind. The audience, one user at a time, is put in the position of this lost cosmonaut. He would sit at a desk, facing a porthole which is actually a screen projected onto from the back (figure 69). The three objects in front of the user – a collection of love letters, a photo album and a star map – contain fragments of texts and images. The basic idea of interaction with these objects is to read the contained texts and images but also to add further writings and drawings. However, this technology adds another dimension to reading and writing. Pointing the pen at images and texts, the user triggers digitally controlled sounds, images and movies mapped onto

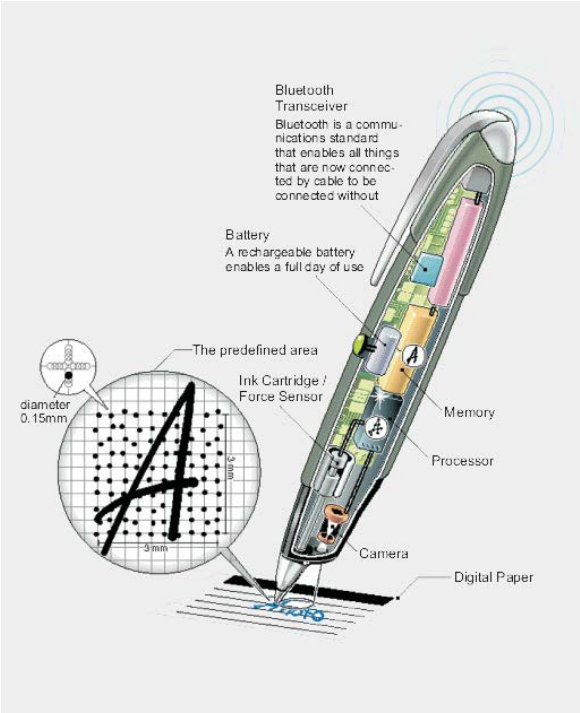
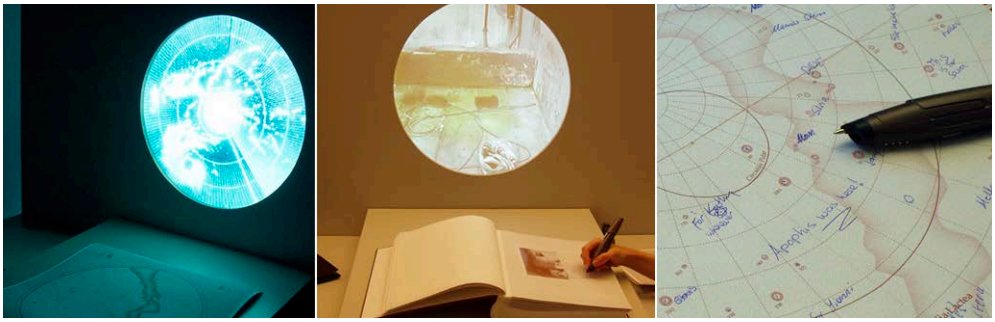


Figure 68: Digitally enhanced paper: An electronic pen identifies its position on a piece of paper via a printed irregular grid, turning paper into an interface for computing. (Image source: screenshot from <http://www.Anoto.com>)



ıre 69: The Lost Cosmonaut: a narrative environment based on digitally enhanced paper. Writing and drawing, in gen- touching the paper, makes the environment come alive. (Image source: author's photo)

the texts and images on the paper. The visual objects are projected onto the porthole. Similarly, the user's writings do not only leave marks on the paper but also enter the digital database as digital objects which can be called during later user sessions.

Another aspect of the environment are so-called moods. Each object is related to a specific mood existing of a specific background soundscape and a specific film projected onto the porthole screen. The love letters, for instance, are accompanied by a view into the night sky with a full moon and clouds slowly drifting along and a relating ambient sound, while the star map is matched by the pulse of a sonar moving across the screen. Each paper object is related to its specific mood via so called RFID tags. RFID (radio frequency identification) is a technology by which a radio antenna receives a signal sent out by a radio tag. Each tag sends out its own specific and individual ID. In this case, the radio antenna was hidden under a slightly ascending board on the desk. The three paper objects each have a different RFID tag attached which is recognized and identified by the RFID reader once the object is put onto the middle of the desk. Thus, every time the user moves a different object to the middle this triggers a change of the environment or mood.

In many ways this project resonates with the experimental storytelling of the late 1980s and 1990s, when theorists like Bolter (1991) and Landow (1992), as well as practitioners such as Michael Joyce, Malloy and Moulthroup, discovered hypertext and databases as a tool for narrative. The Lost Cosmonaut project has a lot in common with this sort of experimental storytelling as there is no predefined sequence to the story. The user heavily influences the order in which the content presents itself. In another respect though, The Lost Cosmonaut is a much more daring project. Other than in most digital storytelling environments, the audience is actually participating in the production of the content. It is a collaborative environment where the audience turns into an author. On top of this, user activities based on keyboard and mouse can easily be restrained while an environment built on the combination of pen and paper naturally allows for a huge amount of freedom which comes with certain risks. This project resulted in the presentation of a prototype and a paper for an internal conference on virtual storytelling (Vogelsang, Signer, 2005).

Project 2: Partial Eclipse

Partial Eclipse (figure 70) is a multilinear movie produced with Korsakow, a software for movie database narration, developed by Florian Thalhofer[152]. The database contains an arbitrary amount of movie clips which are displayed according to rules set by the author and influenced by user actions. Korsakow provides the user with a single screen interface plus an additional navigation showing preview screens of other film snippets. By clicking through these movies and watching them, the user combines the clips into a very specific personal order. Clips which have been watched are automatically discarded by the system to avoid repetitions. Another influence on narrative and dramaturgy are the rules which define the order of the movie.

The construction of dramaturgy for database narrative is a rather problematic affair due to the fact that control over the order of content is passed over partially to the audience. Nevertheless, the piece The Partial Eclipse is exactly this: an exploration in building a dramaturgy for a database narrative. The piece is built up as a dialogue between a man and a woman. Both are talking about relationships. The spoken texts are soundbites taken from two interviews in which a man and a woman talk about their life and their experiences with relationships in general. With regards to the footage, a similar strategy is applied as in the piece The Memory Palace which was briefly described in chapter two. There is a metaphoric relationship between the moving imagery and the text, the spoken word that is. The man's soundbites are illustrated with footage from space travel while her words are accompanied by footage of a camera passing through a derelict factory. After an introduction, the piece moves through three levels: meeting someone, being in a relationship and the end of a relationship. While the user is always presented with a choice of clips on each level, he is nevertheless forced to move through all three levels from one to three. At the end, the movie offers a restart. However, the user is still in the same session and if he decides on a restart, earlier watched clips will have been discarded by the system and the user will hear and see a similar story told with different footage and text. Thus, the system is constantly retelling the story of living through a relationship from beginning to end with different words and from two perspectives.

This project was shown at the Pixxelpoint International Computer Art Festival 2005 in Nova Gorica, Slovenia.

[152] The software is available through <http://www.korsakow.com/ksy/>

gure 70: Partial Eclipse, a multilinear story produced with Korsakow, a software for moving image database narrative. nage source: author's photo)

Project 3: Moving Poetry

The moving poetry project is based on a hack of a proprietary mind mapping software called *Personal Brain*[153]. Personal Brain allows one to enter, connect and search concepts, ideas and links to documents, each of which is represented by a term. The user can establish parent-child relationships between terms but also *jumps* which allow for the direct connection between any two terms. Those terms are called *thoughts* and their relationships are displayed in the form of a so called hyperbolic tree structure where everything is organized around a central object, or thought for that matter, and the related thoughts branch out from there, often revealing further sub-branches. What made Personal Brain so interesting for this project, is its function called *wander* which is an animation mode in which the software automatically moves from one thought to the next via the connections which the user has established. At the same time as a thought moves to the centre of the animation it pulls up the related thoughts connected via parent-child relationships or jumps. This functionality was very inspiring as this animation seemed like a concrete poetry machine, producing an ongoing sequence of poems. Accordingly, the idea was to use Personal Brain as tool not to wander through a mind map but through poetic texts. (figure 71)

Various texts were chopped up into single words or parts of sentences and entered each into personal brain as thoughts. Then, different rules are devised according to which thoughts would be connected via parent-child or jump relationships. Then, Personal Brain would be made to *wander* through the terms while the animation was recorded with a screen capture device. It seemed that the floating movement of the wander animation particularly lent itself to using texts related to water. Thus one of the texts chosen was Mallarmé's famous *Un coup de dés* which is one of the first visual poems of modern times. The semantics of the original poem do not only rely on the words as such, but also on differentiations in text size as well as spatial positioning. In this sense, the moving poetry project is a continuation of Mallarmés experiment with topographic writing by adding movement as another formal level of expression.

[153] Available through <http://www.thebrain.com>

gure 71: screenshot of one of several moving poetry projects done with the mindmapping software Personal Brain. (Image urce: author's photo)

APPENDIX II: RELATED PUBLICATIONS

All publications are presented in their original form and layout.
The appendix contains:

Vogelsang, A. & Austin, T., (2004), 'The art audience as user', *Proceedings of the Pixel-raiders 2*, Sheffield Hallam University, Sheffield,

Vogelsang, A. & Signer, B., (2005), 'The lost cosmonaut: an interactive narrative environment on basis of digitally enhanced paper', *Virtual Storytelling: using virtual reality technologies for storytelling, third international conference, ICVS 2005*, Subsol, G. (ed.), Strasbourg, France, pp. 270-279.

Vogelsang, A. (2008), 'Web 2.0: Schwarmintelligenz oder Diktatur der Massen[154]' in: *Bionicprocess*, Reinauer, P. (ed.), VDM Verlag Dr. Müller, Saarbrücken, Germany, pp. 212-222.

[154] English: 'Web 2.0: Hive Mind or Dictatorship of the Masses'