Writing With the Code - a Digital Poetics

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Abstract

This paper (presented at *Digital Arts and Culture Conference*, Bergen 2000) proposes a digital poetics, which focuses on the possible digital transformations of writing and reading with examples from current cybertextual literature. The paper discusses how programming structures (algorithms, cybernetics, object oriented programming, hypertext) can be interpreted as literary forms. The outcome is a literary way to *read* programming structures and a discussion of a digital literary poetics. As a consequence this paper argues (by taking some initial steps) for further crossdisciplinary research in the field of digital writing between literary theory and computer science as a way to understand the general cultural impact of the computer and as a way to further develop creative innovation.

The Computer as a Writing Machine

The computer is a machine that apart from its mechanical construction is composed of writing.[1] What I will propose in the following is a literary interpretation of the computer, which of course does not cover all aspects or uses of the computer, but focuses on possible transformations of writing and reading. Such a literary interpretation of the computer is of course important for literary studies, but I believe that the literary approach can also contribute to a general, critical understanding of the computer and some of its cultural impacts. Therefore I shall in this paper propose an outline of a digital poetics, and briefly point to current digital literary examples. My aim is to demonstrate how this rephrases concepts from computer science as poetological and literary concepts and vice versa; how digital literature through its writing process demonstrates the literary and cultural significance of programming and of the computer. As a consequence this paper argues (by taking some initial steps) for further crossdisciplinary research in the field of digital writing between literary theory and computer science as a way to

understand the general cultural impact of the computer and as a way to further develop creative innovation.[2]

A machine composed of writing is of course a great opportunity for contemporary writers. As it has already become clear for most writers through their use of word processors and the Internet, the computer is a great tool for producing, storing, editing and distributing text. Most published texts today have passed through computers and probably using the computer as a tool has influenced the writing in some sense, though it is difficult to survey such an influence.[3] The next challenge, however, arises when writers move beyond regarding the computer as just a tool for their writing; when writers move beyond writing only for the printer and the screen. When writers start interacting literary with all levels of code in the computer and they take advantage of a great new range of codes - writing with the code at all levels of what writer-programmer, John Cayley, has called the 'programmatron'. [7]

Algorithms - an automated text-machine

Written computer programmes are composed of algorithms. An algorithm is a finite, systematic procedure - a detailed and unequivocal recipe that produces output from input; and in the computer, this is done automatically. The computer automatically reads the input and executes the algorithm that produces the output, with no need for a human reader or writer. In this way, the algorithm becomes a machine for producing text according to a set of procedures set up by the author. Of course, it is problematic to assume that the computer or the algorithmic text-machine thereby becomes the author. Instead, the author rather becomes a textual engineer constructing textual machines, media or spaces.

The digital author thus gains more control over how his/her text behaves and is presented: S/He does not only control the words and the layout of the words, but s/he can also write with kinetic features such as speed, movement, visibility, etc. E.g., the author can give the text its own inherent temporality such as Stuart Moulthrop in his *Hegirascope* [4], which is a hypertext fiction published on the World Wide Web (WWW).

In *Hegirascope,* most text pieces (lexias) have four links that the user can follow to other parts of the hypertext, but there is also a fifth temporal link coded in the HTML code that causes the text to move on to a new specified lexia if the user does not manage to click on a link within 30 seconds. Therefore, *Hegirascope* enforces a certain speed and rhythm in the reading that creates - as in the case with neon signs and other instances of urban textuality meant to be read in motion - a certain

superficial and impulsive reading mode compared to the more reflexive, calm reading mode of the printed book.[4]

Another rather different example of a text-machine with an inherent temporality is John Cayley's *The Speaking Clock* [1] where an algorithm composes a sort of evolving lyrical chrono-text choosing words from a prewritten text in accordance with the current date and time on the computer running the text-machine (cf. also [13]).
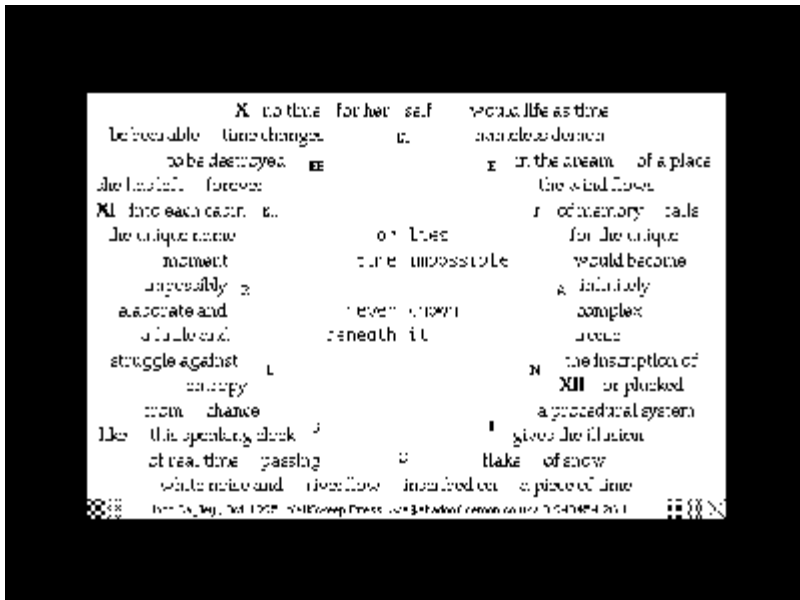
(John Cayley: *The Speaking Clock*)

Cybernetics - reading the reader

Whereas the algorithmic text functions automatically and independent of, or indifferent to, the human reader, the reader is enclosed by another principle of digital writing. By virtue of a cybernetic feedback loop, it is possible for the author to bring the reader into the textual machinery - or at least to construct a dynamic implied reader adapting to the actual reader through a cybernetic feedback loop. As Espen Aarseth emphasises with his concept of cybertext, the text is seen as a machine, and the reader is integrated and is able to regulate the text-machine via cybernetic feedback.[5] That is, the reader is not limited to reading and interpreting the text but can also influence its production. Alternatively, seen from the sender's point of view,

the cybertext is able to adjust itself to its reader. This is increasingly seen on commercial web sites that collect data about the reader through the reader's behaviour and choices - e.g. how s/he moves about in the hypertextual web site - in order to use this gathered knowledge to automatically customise the pages to the individual user.

An algorithmic cybertext is consequently a form of writing machine that works automatically by interpreting actions and effects in its context (which includes the reader) and by reacting to this interpretation. A cybertext is able to configure the reader within its frames or read the reader's reading and adjust itself to this actual reading. In this way, a cybertext can function as a mediated mirror configuring the reader in its perspective and constantly adjusting to how the reader reads. Cybertext is an automatic, mimetic form of textuality that has the potential to frame the reader or configure the reader within its frames.

A literary example of this is the Danish CD-ROM *Blackout* [6] where one enters the narrational space through an alter-ego character called Gabriel. Initially one evidently does not know this character which in the narration is mirrored or mediated by the fact that the alter-ego is a schizophrenic with amnesia, who, thus, does not know himself either. The reader's task is to help her/his alter-ego, Gabriel, in finding himself and thereby discovering her/his role in a criminal plot. But while the reader is reading the narrational space of *Blackout*, the cybertextual machine is simultaneously registering the choices and style of interaction of the reader behind the screen, thereby confining the reader (through the alter-ego) to one out of four temperaments. These temperaments, in turn, decide further actions and choices in an increasingly fatal and tense dynamic that ultimately produces the ending. In short, while the reader reads the cybertext, it in turn reads the reader and reacts to her/his reading.

The reader's ability to perform a reading on a meta-level, where s/he both reads the cybertext and reads how the cybertext reads him and reacts to her/his reading, is trained and rewarded with the possibility for choosing a happy ending in *Blackout*. The other three endings are fatal; maybe as a comment on the politics of reading cybertexts on and off the Internet. *Blackout,* thus, through this formal play with the reader demonstrates and makes readable what many commercial cybertexts on the web performs hidden, behind the screen – how the reader's reading is read, reacted upon and thus dynamically written.

(*Blackout*: The reader's alter-ego)

Object Oriented Programming and Poetics

Since the invention of Object Oriented Programming (OOP), invented with *Simula 67* and popularised with Bjarne Stroustroup's *C++*, the programme code is no longer a unified static, underlying control structure, but is instead an assembly or a dynamic space of scripted objects. An object-oriented program is built of discrete, self-contained programmed objects that can either refer to objects within the context of the programme or be purely logical objects. These objects can then interact cybernetically with each other by sending out messages and requests, and furthermore, they can interact with the reader and the reader's scripts: that is, the preferences or scripts that the reader has generated, with or (as in *Blackout* and in many commercial applications) without her/his knowledge. The space of an OOP environment is thus a cybernetic scripted space: a space defined and described by scripts, with scripted objects; and, furthermore, all of the scripts are capable of reading and re-writing each other and ultimately their environment, the scripted space. As with the computer itself, there is no invariant boundary between the structure of the programme and its data; between the form and its content, or between the space and its actors.

With OOP, the writing of computer code has become an experimental process constructing scripted spaces inhabited by objects with coded properties and interaction. What the author-programmer ultimately writes is consequently a scripted space that includes the inscribed reader and where objects have scripts that potentially perform narrative actions or events in a cybernetic dialogue with other objects of the scripted space such as for instance the reader (as s/he is represented or scripted within the scripted space). The writing literally constructs the space and the objects in it, and the constructive, experimental approach is furthered by the fact that the writer-programmer can add new objects and properties and then observe the results.[6] As with the programme code, the narration is potentially no longer necessarily a static unity and it seems more fitting to talk about scripted narrative events within a scripted space.[7] Thereby, the author-programmer has the possibility of creating fictional worlds that in a literary way represent the current commercial trends towards constructing narrational, 'themed' environments especially in malls, urban centres and of course theme parks.

Besides the automatic, kinetic possibilities of the algorithmic text and the mimetic features of the cybernetic feedback loop, what is made possible is a poetics of objects, of things and their interaction. A spatial, materialistic or perhaps phenomenologically oriented poetics whereby the author has the potential of letting the objects do the telling. In CD-ROMs, such a scripted space is often a rather depopulated experience, most notably in the classic CD-ROM, *Myst* [3], but this poetics can also be used to build a social space. In MOOs (which is object oriented Multi User Domains (MUDs) on the Internet), the scripted space is constructed or built by several authors each constructing her/his own objects and character(s) and controlling the interaction of her/his character(s).[8] A MOO scripted space is not a space that primarily is to be read, similar to the way a city does not exist primarily to be read. Instead, it is a space to explore and live in - textually. Another example of social applications would be multi-player games such as *Quake*, where users can play over local networks or the Internet and even construct their own spaces and make them available to others. Ironically, the initial and defining social activity of many multi-player games is exterminating the other players.

The Network - Writing with the Form

Hypertext was probably the first literary use of the computer that made itself significant on the literary theoretical scene. Later on, hypertext has become the governing principle of Internet's World Wide Web. As exemplified by the WWW, hypertext allows for a distributed network text with multiple nodes or servers, although the extent to which a hypertext is distributed can of course vary, and many

hypertexts are contained by a single server or on a single storage medium such as e.g. a diskette or a CD-ROM (cf. note 4). - Steven Johnson has called the link the first significant new form of punctuation in centuries and he expects a whole new grammar of possibilities [8, pp. 110-111]. Great many authors have created literary hypertexts and some writers on the WWW have even moved beyond the interface and written with the network or used the codes controlling the network in their literary praxis. Instead of just writing *in* a web these writers write *with* the web: They directly explore the new grammar of the link and how this electrical punctuation mark already influences writing and reading, especially on the WWW.

Besides being a textual network instead of a book, hypertext gives the writer greater possibilities of playing hide and seek with her/his form; partly hiding, partly revealing it and controlling the reader's possibilities of surveying the form. In other words, one of the greatest possibilities of hypertext is its possibilities for writing with the form or the medium - in fact when writing with the vast WWW and its dynamic potentials, writers can even make aspects of the form dynamic or open-ended. Hypertext thereby offers the writer new ways of controlling the reader and the reading. S/He can in different ways control the reader's access to the text, compared to the book where the reader always can see the whole book, skip chapters and read the ending first.[9]

One of the first and most profound literary experiments of writing with the web was when the Central European artist group, *Etoy,* between March and August 1996 hijacked more than half a million web surfers [2]. *Etoy* simply intruded upon some of the most popular search words of the major search engines on the WWW: When web surfers clicked on a link to a site apparently about "Porsche" or "Sex", they risked ending up at *Etoy*'s web site, at that time a fictional "Tanksystem" making satirical comments on the rapidly increasing commercialisation of the WWW. *Etoy* has since then critically demonstrated the discourse economy of the link in their writing – how words become commodities, trademarks and valuable adresses. The most recent performance from *Etoy* was the unitended but nevertheless very demonstrative lawsuit against *Etoy* by the Internet toy-shop *eToys*, who claimed that the *Etoy* artistgroup confused their potential consumers through the similarity of names and wanted them to give up their domainname, though the *Etoy* artistgroup was online years before the toy company. *Etoy*'s (the artistgroup) answer was a *Toywar* involving a lot of people from the creative and critical net communities. In this way, *Etoy* demonstrated how the hypertextual WWW is potentially manipulative. Instead of "empowering" and "liberating" the reader,[10] *Etoy* showed that there are persons and powers behind the screen controlling the links and thereby controlling the reading - in fact even tracking the reader's reading by registering her/his 'clicks' which was demonstrated by the "Etoy.nightspy" in the Tanksystem's gallery section.

(Etoy's Digital Hijack)

How reading and writing on the WWW are controlled by a complexity of coded layers, and how most of this code is kept from the 'user-friendly' interfaces, is a constant theme of the ever challenging Belgian-Dutch artist duo, *jodi* [5]. *Jodi* specialise in showing textual interference phenomena between the human, communicative writing and the more machinic, coded layers in the computer and on the WWW. Their web sites are constantly changing and a description does not render their complex literary performances justice. However, a general theme seems to be *jodi*'s undermining of the functionality of interfaces in a repeated demonstration of the fact, that there are no invariant borders between programme and data. Their work hacks open the black box of the programme and the interface and demonstrate the writing going on behind the screen. Thereby they demonstrate how the interface simulate borders between what is perceived as a stable, commodified programme and the user's private data, while in fact the interface functions increasingly as a camouflage for the streams of code and cybernetic feedback loops going on whenever one touches the mouse or the keyboard.

In a computer, basically everything - the interface, the programme behind the interface, and the user's data - is stored on the same level as bits and bytes and there are no invariant borders between these levels. In other words, even the borders that we perceive between our data and the programme - or between the content and the form - are coded or written. For example, *jodi* demonstrate that the windows

and pages that we see as the WWW [11] are, from the computer's point of view, co-ordinate systems showing and returning streams of code. Everything is coded and therefore open for literary editing and writing, seems to be their dictum - a statement that is critically subversive towards a 'user-friendly', visually oriented functionality. Although they never really damage your data or computer - though it often looks like it - their writing aims to subvert naive, 'user-friendly' conceptions of the computer such as the ones offered for sale by the industry leaders. As other great works of literature, *jodi* show how our digital reality is controlled and mediated by symbolic codes and thereby they question preconceived notions and habits in our daily interaction with computers and Internet. Moreover, they even got a great sense of 'hacker' humour.
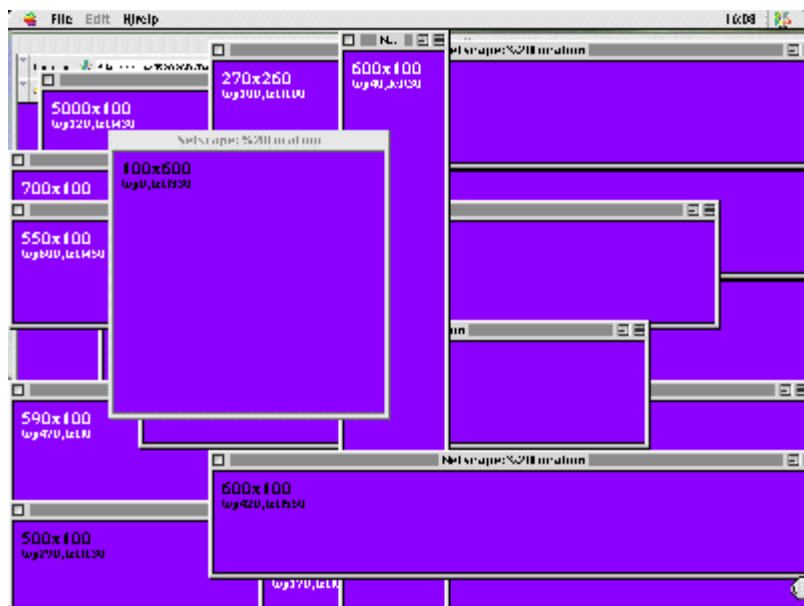
(Jodi: *Day66*)
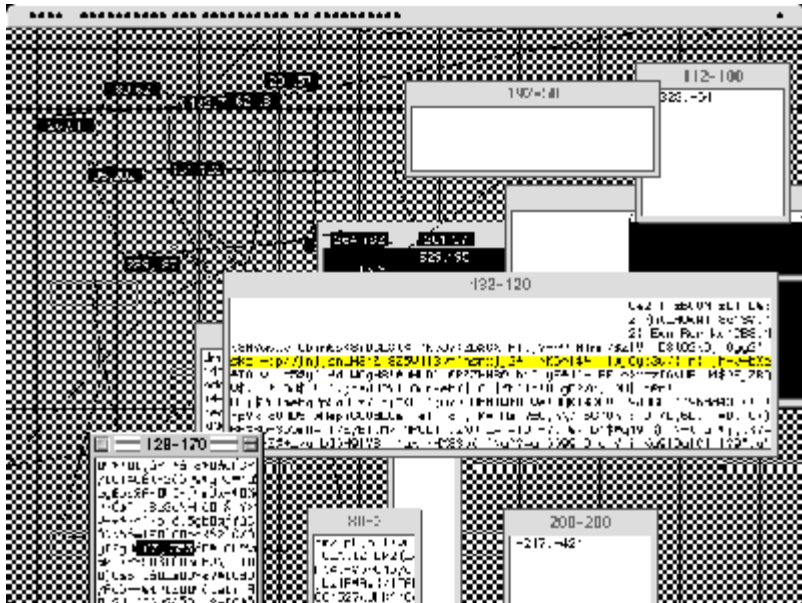
(Jodi: ⋯⋯.⋯)

Conclusions

In this paper I have attempted to interpret code-related concepts – such as the algorithm, the cybernetic feedback, and the hypertextual network – as literary, poetological concepts, and I want to finish with drawing three conclusions. The first is that the code is important for the reading and understanding of the symbolic, cultural and literary output of the computer, even though it might be unreadable and kept from most readers' attention. The code is significant as a textual form, which the writer can write with and edit in order to construct and configure the reading. Therefore we need to interpret the code and the forms of code as contemporary literary, aesthetical and cultural forms – a sort of cultural studies of the computer. My second conclusion is that digital literature, such as I have presented it here, exactly deals with such interpretation of the code – it deals with making the code visible, demonstrating its significance. That is, digital literature is (among other things) about making the normally hidden code readable. From this it becomes clear, which is my third and last conclusion, that digital literature potentially has key importance as a critical investigation into the computer, which enacts and demonstrates the significance of the computer and basically makes it readable. Without digital literature, we cannot read the computer – but are reduced to just

surfing on the perceptual surfaces. Digital literature makes the contemporary, digital writing machines readable.

References

Digital Literary Works

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2. Etoy: http://www.etoy.com, http://www.hijack.org/, http://fan-club.etoy.c3.hu/tanksystem/ and http://www.toywar.com (accessed February 2001)

3. Miller, Robyn & Rand: *Myst*, (Cyan/Bröderbund 1993)

4. Moulthrop, Stuart: *Hegirascope* (1995, 1997): http://raven.ubalt.edu/staff/moulthrop/hypertexts/hgs/hegirascope.html (accessed February 2001)

5. Jodi: http://www.jodi.org, http://oss.jodi.org, http://404.jodi.org (accessed February 2001) (Jodi constantly rearranges their sites)

6. Valeur, Michael, Simon Andreasen & Simon Løvind: *BLACKOUT,* (Deadline Multimedia, IQ Media/BMG, Denmark 1997)

Secondary Works

7. Cayley, John: "Of Programmatology", in *Mute*, 11, 1998

8. Johnson, Steven: *Interface Culture*, Harper Edge, New York, 1997

9. Landow, George P.: *Hypertext - The Convergence of Contemporary Critical Theory and Technology*, The John Hopkins U.P.: Baltimore, London 1992

10. Winkler, Hartmut: *Docuverse - Zur Medientheorie der Computer*, Boer: Regensburg, 1997

11. Winkler, Hartmut: "Flogging a Dead Horse", http://www.uni-paderborn.de/~winkler/flogging.html (accessed February 2001)

12. Aarseth, Espen: *Cybertext - Perspectives on Ergodic Literature*, The Johns Hopkins University Press: Baltimore and London, 1997

13. Aarseth, Espen: "Aporia and Epiphany in Doom and 'The Speaking Clock' - The Temporality of Ergodic Art" in Marie-Laure Ryan (ed.) *Cyberspace Textuality*, Indiana University Press, 1999

Notes

1. Although the computer is currently marketed as a visual multimedium enabling intuitive, 'user-friendly', visual communication, there are no images beyond the interface. Everything is stored as bits and bytes, an electrical form of notation that can be approached as a development of writing in the sense that it shares and develops some of its defining characteristics: All levels and data in the computer are in principle open for editing and thus for writing and re-writing since both alphabetic writing and digital code are arbitrary sign systems (as opposed to some forms of visual and auditory data, that could not be edited to the same extent until the advent of the multimedia computer). In fact already alphabetic writing is digital in the sense that it is composed of discrete data (letters) from a finite set (the alphabet). See also [10].

2. In this sense this paper continues the crossdisciplinary activities within the Hypertext community (which I do not have the space to enumerate here (cf. eg. [9]) but moves beyond the concept of hypertext to include broader algorithmic and cybernetic concepts of text and programing as well as multimedia and net art. This paper aims (given the limited space) to argue by pointing to examples and carrying out brief analyses instead of setting up a theoretical framework and discussion. Hopefully, however, it will lead to theoretical discussions.

3. Which does not mean that it is futile as an interpretative perspective on modern literature. For a starting point see e.g. N. Katherine Hayles: "The Materiality of Informatics" (in *Configuration*, 1992, 1: 147-170).

4. Cf.: Walter Benjamin's *Einbahnstraße* where he investigates a certain urban textuality and reading, an argument that I develop in my "An Aesthetic Criticism of the Media" (*Parallax*, 1999, vol. 5, no. 3, 22-35). Aarseth also comments upon (an earlier version of) *Hegirascope*, where he concludes "The added effect of the temporal pull turns *Hegirascope* into a hypertext parody..." ([12], p. 81).

5. The concepts of hypertext and cybertext often get confused. Hypertext is a term coined by Ted Nelson in 1965 in relation to his more or less utopian Xanadu project and it designates a collection of documents (nodes) or text pieces (lexias) with links between them as e.g. in *Hegirascope* and on the WWW (though all hardcore hypertext theoreticians will argue that WWW is not truly hypertext).

Later in the early 1990s, George P. Landow and others introduced the term into literary theory [9]. A hypertext can be both local - residing on one single computer or disk - and networked; distributed on multiple computers as the WWW. Hypertext with added multimedia is often referred to as hypermedia that is distributed multimedia. Whereas hypertext is a rather non-defined concept ('hyper-' simply meaning 'super' or 'over'), Aarseth's concept of cybertext makes explicit reference to cybernetics. Cybertext is not limited to the computer but is a perspective on all forms of textuality ([12], p. 18), though a perspective that "focuses on the mechanical organization of the text, by positing the intricacies of the medium as an integral part of the literary exchange." And later: "A cybertext is a machine for the production of variety of expression" ([12], p. 1, p. 3). Thus, although Aarseth is careful to point out that a cybertext is not necessarily computer based, the concept of cybertext is a perspective on textuality that is heightened by digital text forms since it expands the concept of text to include the medium or the machine. (In this sense, it goes in line with my initial premise that the computer is composed of writing and it is thus a writing machine that should be included in digital textual analysis and production).

6. Of course, the user can also be given this possibility of adding new objects, properties and spaces, though normally the user is restricted by the framework of the programme. Often the user is allowed to influence and develop a puppet or alter-ego figure, but in MOOs and some network games (e.g. *Quake*), the user has more wide-ranging powers (see next paragraph in the main text).

7. Still, it is of course possible (and normal) to provide a certain narrative unity, e.g. by the use of a frame-narrative, a fictional space and/or a fictional temporality as in many games. The concept of scripted space is initially developed by the cultural critic Norman M. Klein.

8. However, the individuals in a MOO do not necessarily have to have a physical human counterpart. E.g. there is a lot of constructed identities, gender switching and even a phenomenon known as 'bots' or 'chatterbots' which is textual machines constructed to perform as dialogic partners. There are also a number of visual MOOs on the WWW such as *Karlskrona2* and *Wolfburg2*, which is experimental social spaces initiated by the Danish art group Superflex (based on the *Active Worlds* system.

9. However, this feature leads to the demand for hyper-/cybertexts where the reader still has some ability to survey or grasp the form, a demand which e.g. is heeded by the many CD-ROMs strongly governed by space (as in the islands of *Myst* and *Riven*, the claustrophobic cities of *Blackout*, *Duke Nukem* or *Quake*, etc.). In other words, post-modern disorientation is easily achieved but often problematic in a cybertext if the reader cannot contextualise her/his disorientation.

10. As prophesised by some poststructuralists and hypertext theoreticians such as J. H. Miller and George P. Landow (cf. [9], p. 178).

11. At least when we access the WWW through the popular browser from Microsoft, Netscape and others. Alternative browsers exist such as the 'artbrowsers' *Webstalker,Headbanger* or *Shredder*. (See my "An Aesthetic Criticism of the Media: The Configuration of Art, Media and Politics in Walter Benjamin's Materialistic Aesthetics" in *Parallax*, vol 5, no. 3, 1999, pp. 22-35).