Interactivity in Adaptive, Subconscious and Concreative Ambient Systems

Beat Suter and René Bauer

"Where do we go from here?"

Google Art is a phenomenon that has come to the attention of the public only a short while ago. In October 2004, the artist and curator Cornelia Sollfrank curated a net-exhibition on Google Art for the low-fi net art locator, a London based project that aims to increase visibility of art projects which use the internet as a medium. Sollfrank notes that Google Art stands for a whole variety of art projects on the Internet which in one way or another work with search engines. Some of these projects reflect on the increasing power of centralized search engines, others take a playful approach to the tools we have to rely on for our daily work and need for information, still others simply make use of search engines in order to select material from the permanently growing database Internet, material which then gets reworked and transformed into new pieces. What all these projects have in common is that they use search engines in a way they are not designed for; they could therefore also be called "Google Hacks." What they also have in common is the fact that they all use interactivity in new and exciting ways. The software and databases are not perceived as passive carriers of information but as manipulatable objects and creators of new connections and interactions.

1. Classical net art

The history of search-engine-based art projects dates, of course, further back than the term Google Art – which, according to Sollfrank, has been floating around in the art scene since early 2004. However, prior to the Google era, search-engine hacks were not really major focuses of netart projects. Upon filing a short paper on Google Art to the Digital Arts and Culture Conference 2005 in Copenhagen[1], the review comittee suggested to the authors of this essay to look at Web Stalker[2] and some works of Jodi and Olia Lialina for historical references. Web Stalker is a browser born in 1997 from an interest in the social implications of software and information visualization. Web Stalker may be best described as a Lynx browser crossed with a Venn Diagram which illustrates logical relationships between different groups of things (sets) by intersecting circles: "The user opens up Web Stalker as a blank screen and then builds windows to perform different functions: a crawler parses Web documents, and a map function creates a local dynamic map that uses circles and lines to represent URLs and links. You use the extractor to grab the text out of the particular document you select to view, and the dismantle window to list the components of page."[3] However, Web Stalker does not use search engines in order to generate specific content, it makes use of the search engine technology of web crawlers in order

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[1] Digital Arts & Culture (DAC), Copenhagen, 1. – 3. December 2005. <http://www.itu.dk/DAC2005/> (14.02.2006).

[2] I/O/D (Matthew Fuller, Simon Pope, Colin Green), Web Stalker, 1997, <http://www.backspace.org/iod/> (30.11.2005).

[3] Brown, Janelle, "Experimental Browser Maps Web's Words", 1997, <http://wired-vig.wired.com/news/culture/0,1284,9024,00.html> (25.11.2005).

to reveal structures of the net. In her work "Anna Karenin goes to paradise"[4] (1999), Lialina indeed uses two search engines and a web-catalogue in order to construct a story of Anna Karenin. However, there is no complex form of interactivity involved; Lialina works with the result pages of searches for "love" and "train" and "paradise" which are very different to the novel's evocations and does not adapt the results any further. Jodi did not use search engines in their projects but made heavy use of generally available user functions in order to break the interface up into pieces and let the user know that meaningful communication may, after all, not be achieved that easily.

The real precursors[5] of Google Art may be found in projects by Cornelia Sollfrank, Mary Flanagan and Christophe Bruno[6]. In 1997, during the work on the project "Female Extension", Sollfrank was looking for an easy and effective way to create netart projects for 289 netartists – all of them virtual. She came up with the idea of a programme which automatically generates sites after the input of some minor data. Sollfrank enlisted the help of a programmer and she was able to file 289 entries for female artists in a contest of the Hamburger Kunsthalle. Curators at first did not realize the fakes, and Sollfrank caused a scandal when she revealed the mechanism of the net.genarator. Since then, five different net.art generators have been created that all use relatively minimal user input in order to look for appropriate material for constructing a site via search engines.[7] The exciting project, in which Sollfrank collaborates with different programmers, is still ongoing; it shows what can happen when an artist plays with the idea of letting a machine do her work and confronts the art world with this idea.
New media artist Mary Flanagan already belongs to the Google era; she has been interested in the functions of search engines as social activities. She developed her netart project "[search]" in 2002.[8] Flanagan's project explores the search as an aesthetic form of mapping the Internet. She examines the search engine as a creator of context and meaning which is deeply embedded into the daily activity of people who are gathering information or seeking entertainment. By using filters, Flanagan reconfigures the engine's content in a way that illustrates semantic levels that are usually not obvious to the user.

2. Google Art

While classical netart projects like Web Stalker or Jodi's projects deconstruct the standard user interface and force users to reflect on patterns of mediated communication and information, the very novel and original feature of Google Art projects lies in its playful and creative approach to the interactive potential of the Google engine. The deconstruction of patterns and processes ceases to be the central focus since it was extensively dealt with before. The search engines are rather used as hosts to create new structures, new semantics and adapt new patterns. The machine becomes a concreator and the question of its interactivite potential becomes a central topic in the artistic scene.

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[4] Lialina, Olia, Anna Karenin goes to paradise, 1999, <http://www.teleportacia.org/anna/ > (25.11.2005).
[5] Amongst the artists who early on worked with search engines were Heath Bunting, Blank/Jeron, and Knowbotic Research.
[6] Bruno, Christophe, Artist's Website, 2002, <http://www.christophebruno.com/index.php> (30.11.2005).
[7] Sollfrank, Cornelia, Net.Art Generator, 1997 – 2005, <http://soundwarez.org/generator/src/gen.html> (30.11.2005).
[8] Flanagan, Mary, [search], 2002, <http://www.maryflanagan.com/search.htm> (30.11.2005).

2.1 Constant Feed of Thoughts

A fair amount of the parasitic and sometimes symbiotic art-projects which are tagged as Google Art try to establish new ways of interactivity and concreativity between human user and machine. Concreative googling means creating new text by means of a search-channel which works as a feed of constant ideas and thoughts, a stream of links and references which can easily be tapped in, since the search engines so far are free to use for almost everybody.

Google Talk, a project by Douwe Osinga (2003), generates semi-sensible texts by expanding sentences with what according to Google will be the most likely next word.[9] After the user enters three to four words, the system will conduct a search in Google, determine a likely next word and add it to the search string. It will then remove the first word of the string and start a new search. This process is repeated several times. The resulting text can either be meaningful or just gibberish: For example, the system returns texts like: "*BETTER THE WORLD BY* consolidating character in societies, families, and individuals" (Italics show the entered words) and "*I HATE TO EAT* Alone i have to work On Christmas. day and New Year s Day Concert Neujahrskonzert Performing". This playful approach to create text with a little help from the internet had a great response with some users. One of them wrote: "This is the future of the internet, seriously. An oracle, that represents the collective mind. In the future it will be more coherent, and a more direct way of connecting to the global mind. Don't ask me how, but I just have a feeling this is going to be the thing."[10] The commentator makes an important diagnose when he compares Google with an oracle, which may represent the collective mind. Google's basic tool PageRank relies on the intrinsically democratic nature of the World Wide Web; its algorithms analyze the extended link-structures of a site and use it as an indicator for an estimate of the quality of the site; at the same time the tool analyzes the sites, which link to that site and assesses the importance of the linked sites. PageRank is combined with a complex textsearch-system, which analyzes in detail the content of a site and all its linked sites. These algorithms seem to be able to pick the relevant information for the user. The idea of a collective mind may be intrinsic to this system since it relies on as many informations it can get its hands on, judges with unbiased adaptive methods and rather successfully tries to eliminate the manipulation by individual human beings. Whoever uses this system for creating a different kind of content like the here mentioned GoogleTalk and the following Googlehouse taps into a hierarchical base of signs, words and pictures which are somehow part of a democratic consciousness of the digital human world – the digital oracle of our time.

The adapted thought patterns can be very different. Google Talk makes use of carefully selected words, which then are put in a sequential order to create a sentence. Googlehouse makes a selection by subject and starts to construct rooms by a selected image feed.

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[9] Osinga, Douwe, Google Talk, 2003, <http://douweosinga.com/projects/googletalk> (25.11.2005).
[10] Ibid. Selected quotes from a long list of comments on the Google Talk Website.

Googlehouse[11] by Marika Dermineur and Stephane Degoutin (2003) is a Flash and PHP application that constructs a virtual house on the screen from images of domestic rooms (living room, bedroom, TV room, etc.) in real time. A user can either choose from existing categories of rooms or create new ones. The images, that make up the house, are provided by an image search engine. Googlehouse creates rooms with pictures; the principle of constructing dynamic spaces is similar to some of the early 3D-games, e.g. *Doom* (1993). Instead of textures Googlehouse uses photos, which are chosen arbitrarily. The created houses contain picture walls: the bedroom features pictures of beds and wardrobes, the kitchen walls pictures of kitchen appliances. Both the house and the individual rooms can be zoomed in and out. The result of the construction is a graphical space, created by the internet, which not just shows how people perceive their living spaces – on a meta-level, it also reveals how people classify images and how these images are then indexed by the search engine in order to organize and redistribute them. This is a system, which is still in constant flow.

3. AND-OR: www.and-or.ch

Our own projects work in similar ways. As art group AND-OR[12] we are looking to find new ways of communication by tapping into the digitized streams of a collective human mind as it is constructed in contemporary media societies and mapping the use of search engines. We are looking to find and expose new ways of interactivity and concreativity between human user and machine. We use feeds of constant ideas and thoughts, feeds of publicly available pictures and sounds and behaviour-patterns of gameplay to visualize what lies beneath the digital surface and beyond the common limits of communication. While we have been working with selective text and image feeds in two projects, which started in 2003[13] (both part of a joint project, "The Famous Sound of Absolute Wreaders"[14]), the following projects from 2004 and 2005 work in different ways. They are visualizing existing communication patterns, which usually remain invisible to users. And through this visualization they create a whole new view on the world, the real and virtual.

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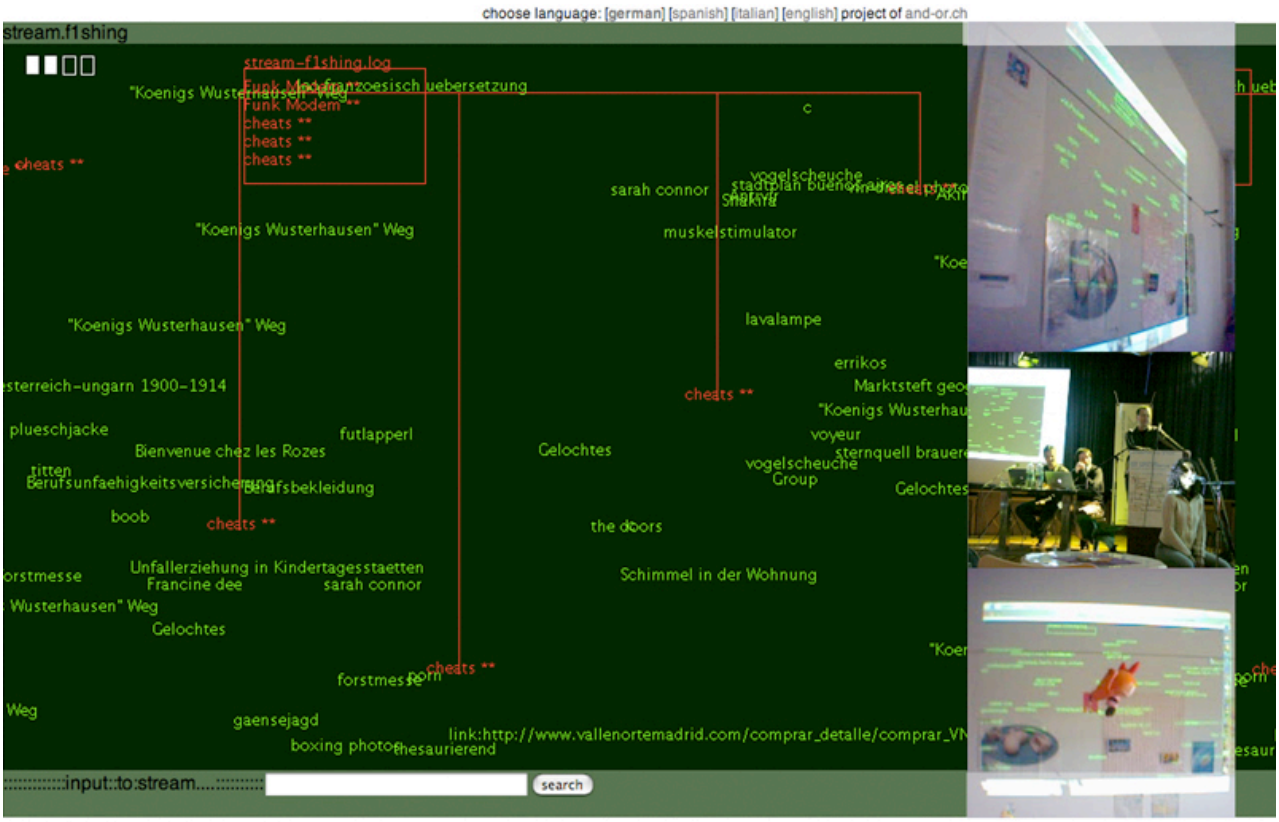
[11] Dermineur, Marika and Stephane Degoutin, Googlehouse, 2003, <http://googlehouse.net/> (25.11.2005).

[12] AND-OR, Website AND-OR, 2005, <http://www.and-or.ch> (30.11.2005).

[13] Suter, Beat and René Bauer, "reinhard döhl lll kunstrad1o : 1o : 1o : v1suelles rad1o: scrabble mit döhl llll llll llll", 2002, <http://kunstradio.cyberfiction.ch/suter/> (30.11.2005).

[14] Auer, Johannes (Curator); Döhl, Reinhard; Egger, Sylvia; Gassner, Oliver; Kieninger, Martina; Suter, Beat, *The Famous Sound of Absolute Wreaders*, 2003, <http://kunstradio.cyberfiction.ch> (30.11.2005).

3.1 Streamfishing: streamfishing.cyberfiction.ch



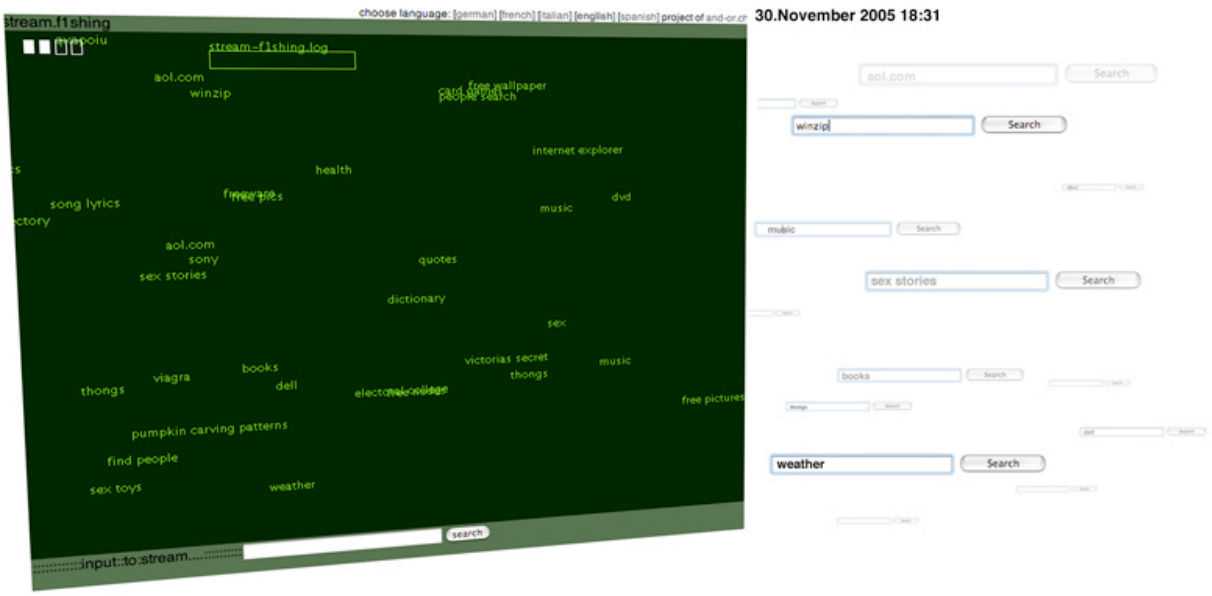
Streamfishing (2004) [15] is an installation in an open, public space that people pass through. Streamfishing is presented on a large billboard showing a live stream of what is going on in the world of human brains. This stream of ideas will, in turn, alter the stream of the people passing by.

Streamfishing is rendering processes and translating them into a different context. The ten latest searches from different search engines are temporalized. Streamfishing turns away from the original function of the engines as search tools and makes the entries, not the search results, the subject of discussion. Streamfishing conceptionally mirrors the single user at home or in his or her office interacting with his or her interface. The viewer passing by, however, watches an area where the typing of multiple single users show up on a single screen. This turns Streamfishing into an instance of collaborative writing. It visualizes 'the world at your fingertips', a world 'just a

[15] AND-OR, Streamfishing, 2004, <http://streamfishing.cyberfiction.ch> (30.11.2005).

click away' and usually invisible to others. Furthermore focusing on all the fingertips working the keyboards anonymously in order to fill the google queries creates a whole new perspective since we get to know thoughts and desires usually invisible, which are not restricted by publishing processes anymore. The interface appears in a context of other interfaces and creates an interacting interface of the invisible.

Streamfishing becomes a system generator, a centre of cristallization where our experience in searching and our imagination recreates worlds and realities. In the terminology of M. McLuhan, Streamfishing would be an extension[16], not a periphery. If we perceive Streamfishing as an extension we get the opportunity to focus on and discuss human search behaviour. It makes it possible to understand search as instantZeitgeist.



If the passer-by opts to interact with the screen of Streamfishing and become an active user, he or she can jump right into the subconscious of the digital world. What are people looking for? Users can see them typing their searches and are made privy to some very intimate questions and desires. As a matter of fact, some people seem to confide into search engines, use them as psychological valves and tell them their innermost anxieties and frightening confessions or they are desperately looking for help with illnesses and injuries. Various realities mingle to become one interactive space. A constant flow of real-life ideas plays havoc with the user's perception of the world. Streamfishing depicts a real-life pattern by pulling together individual fragments of reality into a virtual image. The fragments of reality are prefabricated thoughts digitally merged into a constant stream of words and ideas. Making this stream of thoughts visible enables the individual thoughts to interact which each other. This means: the virtual image or world is revealed as an interactive reality of human being and machine and can be used for further communication and exchange of ideas.

[16] "In einer elektrischen Struktur gibt es, was die Zeit und Raum auf unserem Planeten betrifft, keine Peripherie." Marshall McLuhan. *Die Magischen Kanäle*. G+B. Fine Arts Verlag GmBH. 1964, 415.

The user is literally able to fish in a constant stream of prefabricated thought. He or she can catch someone else's thought and put it in the bucket or throw own ideas into the stream and see what happens. Any input in this particular search-engine will show up in the stream. It is possible to use streamfishing to communicate via search-engine.

Metaphorically speaking Streamfishing visually references the universe and its stars, drifting on eternally. The Crackers and the Demoscene of the 1980ies often used graphical references to space in their elaborate ASCII-tags which functioned as greetings and unofficial introductions to hacked games. The universe as an ever-expanding space had been the right metaphor to describe and experience eternity, the feeling of being lost in space, immersion and virtuality. The universe in the 1980ies was the realm where the classic laws of Newton were being rendered obsolete and anything was rotating eternally and without resistance. The perpetually rotating cube became a fitting symbol of the eternally rotating algorithms of the software. Streamfishing sets a contrast to the intros of the crackers with its colour scheme. While the intros worked with many variations of colour and shape, Streamfishing shows a monochrome green screen reminiscent of the monotone office computers of the 1980ies using Hercules graphics cards. This turns the ever-expanding universe and its dynamics into an algae green river for fishing.

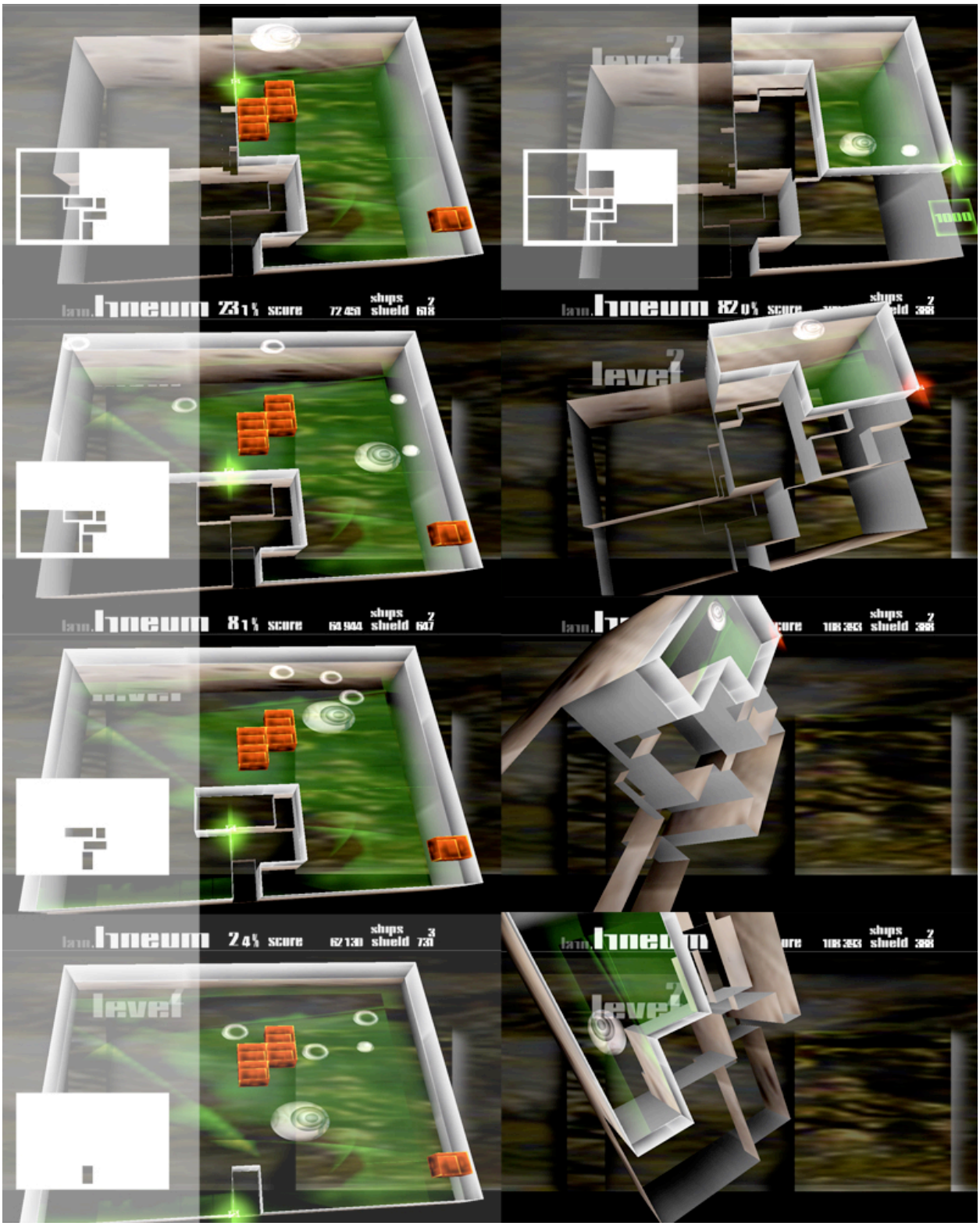
Streamfishing constructs a system out of the experiences of many single users. In bringing together single snippets of mediated and prefabricatet life, it manages to create a common subconscious. The work "Nybble-Engine" (2003) by Margerete Jahrmann and Max Moswitzer[17], on the other hand, does not use the subconscious of human beings but the 'subconscious' streams of a multiplayer game, Epic Games' *Unreal* (1998). The artists freeze a game in mid-play – with all its temporary states, its positions and statistics of the players, its artificial intelligence – and create from it a new space, which can be used for playing and can therefore be experienced with our senses in a very different fashion. In a final consequent step, touchable 3D-plastic models have been created. This way, a work of art facilitates the understanding of a system. The communication, which can be observed, is congruent with the system of the game and becomes its own outer cover. On a surface level, users normally have to be able to set both games and search engines back into an original state in order to start all over again. Experimental devices like games are not supposed to make inscriptions onto the world. Projetcs like Streamfishing, Nybble-Engine and Gamescape do not follow this unwritten rule: They are experimenting along the difference of virtuality and play and focus on the subconscious of their systems.

3.2 Gamescape: www.and-or.ch/gamescape

Gamescape[18] is an extension to the retro-game *l1neum* (2004) by "la1n".[19] It tries to capture the performative aspect of interactive gaming by visualizing all playing movements of a player as a 3D-sculpture. While the movements of one player make up a sculpture, all sculptures of all played games of all players are collected on a server and form an entire city – a city consisting of structures created by the gamers' movements. This visualization of structures shows an ever-expanding universe of movements – finished and unfinished – and may in the future be a starting

[17] Jahrmann, Margarete and Max Moswitzer, Nybble Engine, 2003, <http://www.climax.at/nybble-engine/> (30.11.2005).
[18] AND-OR, Gamescape, 2005, <http://www.and-or.ch/gamescape> (30.11.2005).
[19] La1n, *L1neum* (Game for MacOSX), 2004, <http://www.la1n.ch/l1neum/> (30.11.2005).

ground for a new game. The different shapes of the buildings can be related to the strategies of the individual players. If a player realizes this, he/she can in fact adapt his strategy in order to determine the shape of the buildings and the city and thus engage interactively on a meta-level with the game.

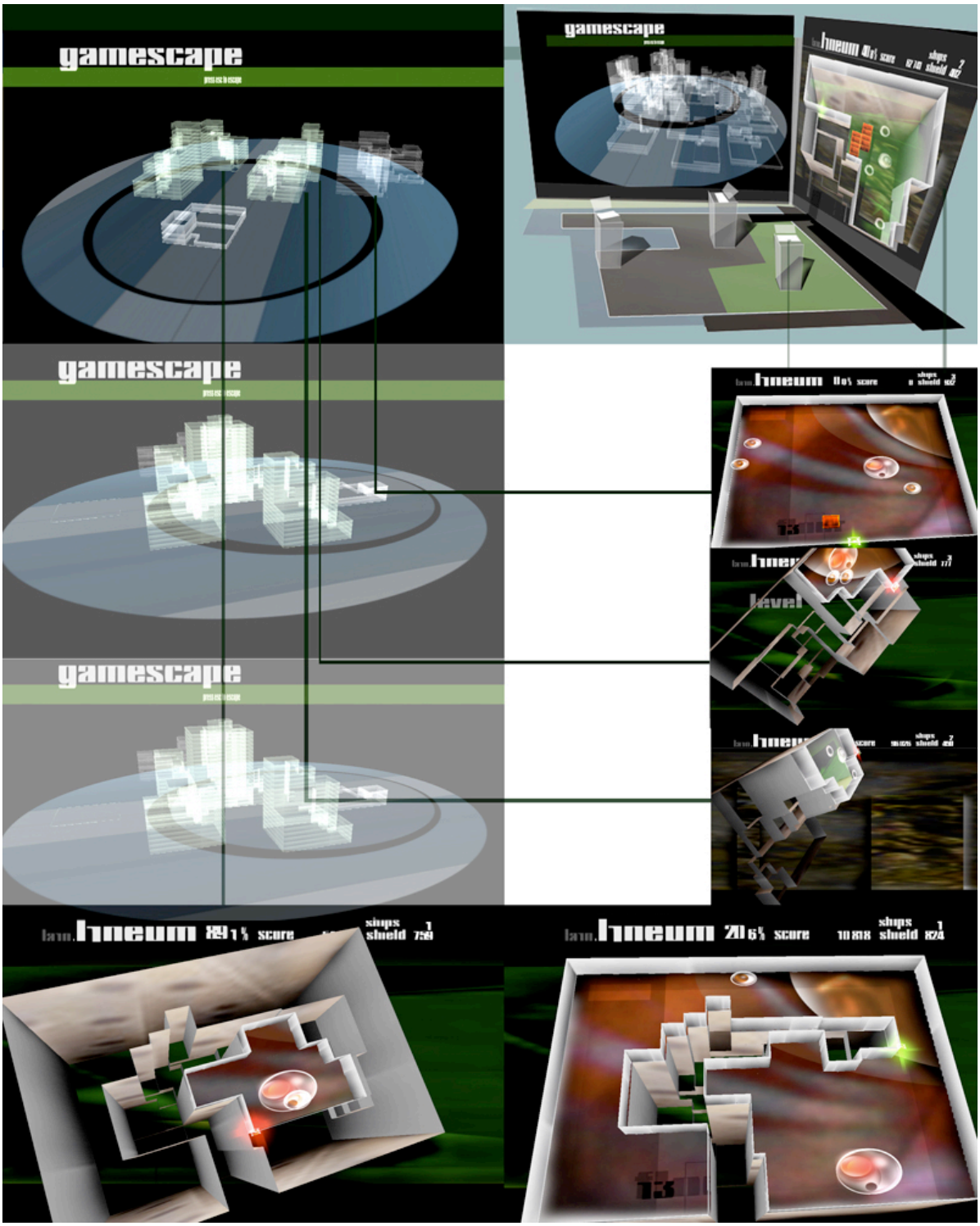


The game *l1neum* stands in the tradition of 1980ies arcade games like Taito's *Qix* (1981) and Taito's *Volfied* (1989*)*. The game's manual reads as follows:

> Your spaceship sits on the wall enclosing the battlefield. Use the arrow keys to move your vessel. The battlefield resembles the racing grounds of 'Tron'. Your enemies are roaming the grounds. Your task is cutting off parts of the terrain. Hold down the Spacebar and move into the battlefield. As you reach the wall in a different spot you have cut off parts of the terrain. Your aim is to cut off more than 80 percent of the battlefield. When you enter the enemy's territory, you are susceptive to attacks by the enemy. On the other hand, you are able to kill enemies (or activate extras) by enclosing them. At the end of the game your lines will be converted into a 3D sculpture. Is it as simple as it sounds? Try yourself![20]

We plan to show the project gamescape on two screens: On the right, the game *l1neum* and on the left, the extension Gamescape. On three computers, visitors will be able to play the game on the left screen and by playing the different levels create more buildings for the ever growing Gamescape-City on the right screen. The computers are located on building blocks similar to the buildings of Gamescape. So far, the game can be downloaded from the internet and installed on individual computers; every level of the game that has been played will be saved as a building and integrated into the city of Gamescape.

[20] Ibid. Quote from the website of L1neum.



All that usually remained from a playing session in older games was the highscore, and storing highscores was a function most older games had implemented. Some games, especially sports games, now also include 'instant replay' functions that allow users to experience a race or a decisive gameplay, which can sometimes even be stored by the player – either as evaluation material for a player who wants to improve his gameplay or as a simple trophy of past achievements. Most of the game levels and even the games themselves fade away after

succeeding. Gamescape now starts using the movements of players as creative material and builds not just sculptures out of traces but also alters the concept of play by moving it onto a meta-level. By using movements or structures, which would normally remain invisible, it introduces the concept of creating an urban environment. When players realize they can create an architectural building for a broader structure, they adapt new strategies for designing an object of their own imagination. This means that players adopt a playful approach of creating a new world and are getting more interested in concreation than in reaching new highscores, more interested in interactivity than in reaching fame by getting his/her name on the board. The Gamescape-sculptures may be perceived as sculptures of interactivity since they are solely made out of space- and time-interactions, which were recorded and frozen for further use.

Gamescape and Streamfishing both assemble single phenomenona of information into digitally mediated streams of thought, transform them into perceptible interfaces and thus render them visible, connectable and usable. Both systems generate a collaborative and creative surface out of these streams. When received, read or watched, this surface turns into a usable interface, the search terms and sculptures turn into new extensions for humans. These extensions make it possible for human users to perceive themselves in a different social environment; as architectural players or playful architects (Gamescape) or as part of a collective and instantZeitgeist community (Streamfishing).

The applications presented so far focus on the digital mechanics of software and on the pragmatic aspect of games and render them visible and tangible. Computer and software now not only mediate between human beings, they generate new components for systems. They are able to initiate and support the conceptualizing of new developments in which the computer keeps a certain independence and manages to do contextual and creative tasks on the side while, for example, a game is being played. The software becomes an actor and begins to work as an independent and concreative element.

4. Nic-las, an adaptive and shapable medium for communities

The first versions of nic-las[21] were, as the name already indicates, theoretically and practically guided by some of Niklas Luhmann's ideas. Niklas Luhmann may, as the self-inflicted "legend" tells us, have owned a card index box (*Zettelkasten*) with entries of important terms and a manual system, which linked the relevant terms with each other. According to poupular cultural mythology, this *Zettelkasten* was a text- and book-production machine.[22] It is fairly easy to rephrase this myth as an algorithm: Take the cards of the subjects out of the index box in the sequence of the subjects that ought to be discussed and write down all the content and links. Then, link all these pieces of text and you receive your text:

> Im Augenblick sitze ich an einem Vortrag über ökologische Probleme in modernen Gesellschaften, und meine Arbeit besteht darin, Zettel [...] zu sichten und so zu kombinieren, dass ich etwas Substantielles zu diesem Thema sagen kann. Die neuen Ideen

[21] Nic-las is a project by René Bauer and Joachim Maier which started in 1998 and so far has been developed into version 3.0.
[22] It thus fully realizes what is still only a project in the Gutenberg galaxy: a 'tableau' of knowledge.

> ergeben sich dann aus den verschiedenen Kombinationsmöglichkeiten der Zettel zu den einzelnen Begriffen.[23]

Luhmann's *Zettelkasten* appears to be a system of self-referential cards. Luhmann referred to his system as a communication with card index boxes. In its first stages of development, Nic-las was an attempt to translate into software the myth of a *Zettelkasten* which is able to write a book by itself. Around the same time, a similar concept of a general *Zettelkasten* was developed by Arthur P. Schmidt in his book *Wissensnavigator*,[24] an encyclopedia of important trends in science, technology, ecology and management. The *Wissensnavigator* has been incorporated into Nic-las 1.0 and is publicly availabe at: http://www.nic-las.com/wissensnavigator/. A second project for a more specialised encyclopedia by internet- and hypertext-related researchers from 2000 at http://www.nic-las.com/enzyklopaedie/ shows how Nic-las as a transposition of a theoretical model has become a complex system which features an inner layer (endo-layer) and an outer layer (exo-layer). During the first stages of development, the focus was almost entirely on the endo-world of the system. But the focus has shifted and is now firmly on the difference between the endo- and the exo-world of the system.

There are only two kinds of possible entries in Nic-las: differences and texts. A difference equals an index card of the *Zettelkasten*, a text refers to a document and can also consist of pictures, sounds, movies or data-archives. On the surface Nic-las seems to work like a *Wiki*. Texts, pictures and sounds can be stored with certain keywords. These classifying keywords in Nic-las are called differences, refering to the theories on difference by Derrida and Deleuze/Guattari. A difference arranges and separates one part of a body from another. A community organizes these keywords according to its own needs and works out its own specific meaning of the terms. Nic-las turns into an "Aufschreibesystem"[25] of this community. At the same time, it becomes a space for storing information (memory) and a space for discussion (communication).

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[23] Luhmann, Niklas, "Biographie, Attitüden, Zettelkästen", in: *Archimedes und wir*, Interviews, ed. Dirk Baecker and Georg Stanitzek, Berlin 1987, p. 125-56, p. 144.

[24] Schmidt, Arthur P., *Der Wissensnavigator, das Lexikon der Zukunft*, Book with CD-ROM, Deutsche Verlags-Anstalt, Stuttgart 1999.

[25] "Das Wort Aufschreibesystem [...] kann auch das Netzwerk von Techniken und Institutionen bezeichnen, die einer gegebenen Kultur die Adressierung, Speicherung und Verarbeitung relevanter Daten erlauben." (Kittler, Friedrich A., *Aufschreibesysteme 1800, 1900*, München 1985, p. 519.)

4.1 Structure of difference and rhizome

As a medium, Nic-las is mostly unstructured and can therefore be shaped according to the needs of a community. The community starts with a first card and builds up the structure with the developing of content and discussion.

> Nic-las is a vital digital medium, which (at least partially) does what users want to imagine. Nic-las creates the possibility of inscribing oneself into the open digital spaces and at the same time remains observable for all members of the community. Based on the system theory of Niklas Luhmann, the basic operations are found in the manifold non-linear possibilities for linking text passages and quotations.[26]

At the same time, the medium and its possibilities are reshaping the communities by becoming an integral part of communication. In this respect, single communities are forming, are structuring their information landscapes and are designing spaces by choosing and developing differences. Examples of such communities can be found at http://www.nic-las.com/stalker/ (theories for Nic-las), http://www.nic-las.com/p1ng/ (a community on the subjects of game und gameculture), http://www.nic-las.com/prisma/ (culture and literary theory community at the University of Zürich). Slowly, a rhizomatic landscape of terms and related objects emerges.

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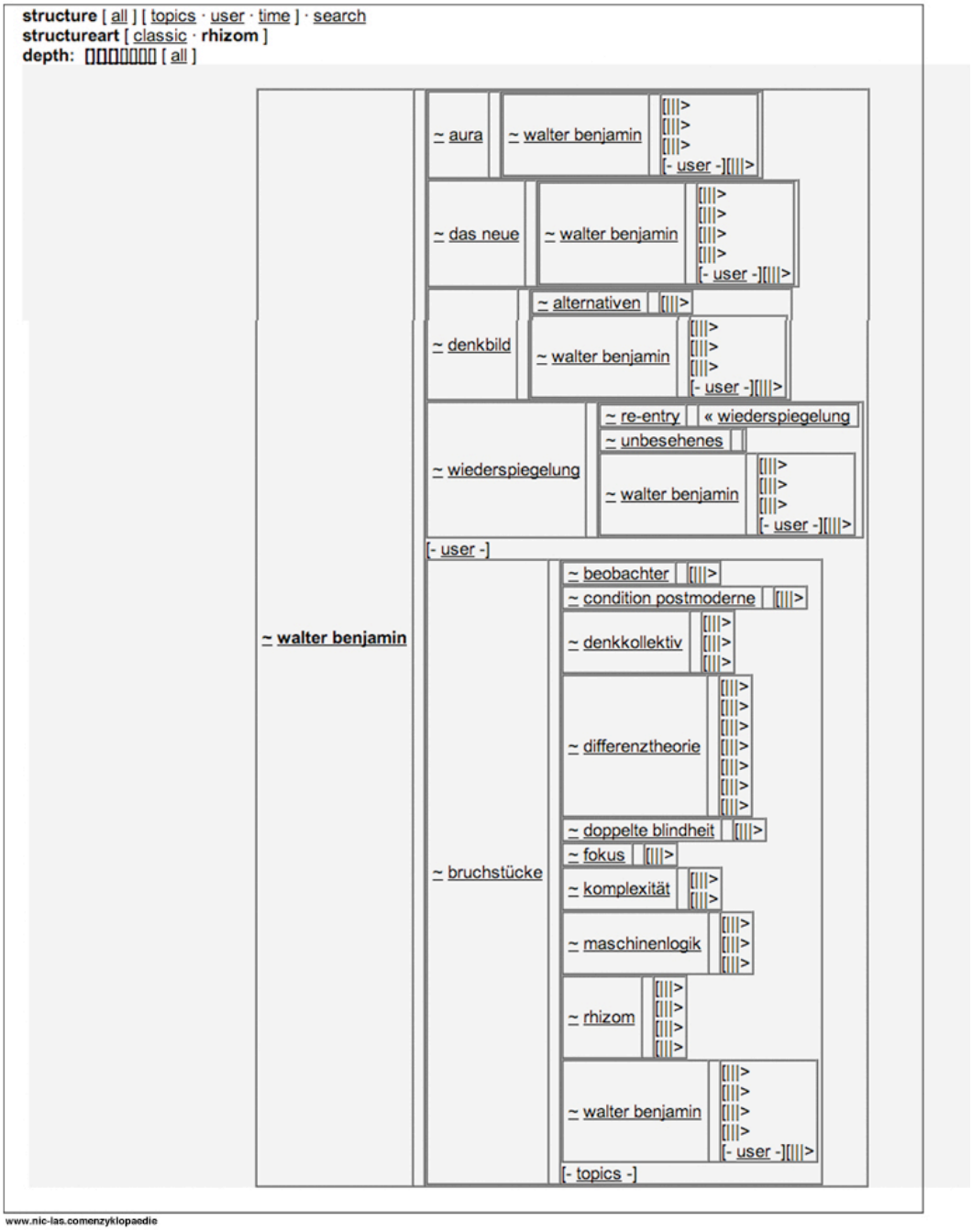
[26] Idensen, Heiko, Hyperdis, 2000 – 2005, <http://www.hyperdis.de/> (30.11.2005).



The organisation of the structure does not have to be hierarchical; it can be set up and organized from each card to any other card. A hierarchical structure only emerges if it is set up deliberately. Much more often, however, there are rhizomatic structures emerging; structures which again look different from each point.

4.2 Autopoiesis (Endo)

Besides the regular and deliberate classification, Nic-las features an additional autopoietical

system, which organizes the texts entered on the basis of its structure. If you for example insert a text(-object) into nic-las (www.nic-las.com/enzklopaedie) with the terms “Walter Benjamin”, “Brüchstücke”, “Rhizom” and “das Neue”, the text floats through the structure of Nic-las. It is going to flow into the difference Walter Benjamin; there it is going to split, one part will flow into the difference “Bruchstücke” and there into “Rhizom”; the other part will flow into the difference “das Neue”. This means that any text will be distributed in the system a second time, this time on the basis of the structure. If someone enters a new difference, the whole system reorganizes itself and automatically redistributes the texts in the system. Nic-las as a medium generates a new context for the texts, intertwines and links them anew. This way the software participates in creating the content. As a medium, Nic-las changes each time the structure changes. Nic-las was designed to extend a deliberate "Aufschreibesystem" with a unique component and creates different references which open new aspects and facets for the ideas and intentions of the users.

Nic-las should be able to adapt to any changes of its users and community as it changes with them and processes the content further. Each user gets to see a different perspective on the content since the system has adapted the previously entered content and sorted it twice.[27] The autopoietical functions complete the content of the system in levelling it out and feeding parts of the system with information, which at first may seem to be rather remote but can turn out be useful.

A user of Nic-las works with this double system and has to tackle the surprising fact that the system participates in his research or work; the system comes up with associations, brings text to the surface that does not seem to be in the right place but is somehow linked to the subject matter. The medium Nic-las becomes a part of the community and turns out to be more than just an "Aufschreibesystem" that works on humans. It may be compared to the system of a library, which works on humans. Software works on hardware, books work on human beings. Nic-las comes with a logic that opposes a deliberate system by extending it and becoming a co-author, a vis-à-vis which has to be taken seriously. The software with its own order and with a momentum of its own is a member of the community as well. Therefore, Nic-las is an autopoietical media- and information system that fills and completes iself. In the end, Nic-las is adaptive to the community, it turns into a skin, an ever-changing environment, and an extension of the community.

If a user wants to initiate research with a new keyword he can just add a new difference. Even if this difference has been entered into the system for the first time, it may show up with content from the previous sessions of other users – the autopoietical system has sorted through the content and washed up related content. The author now sees what the community is working on and has the opportunity of joining the discussion, adapting it to his needs and changing its focus. The additional content Nic-las generates comes in varied associations and links to "the system" of the user. The community then has the choice to select from the variations and possibilities of the larger system environment.

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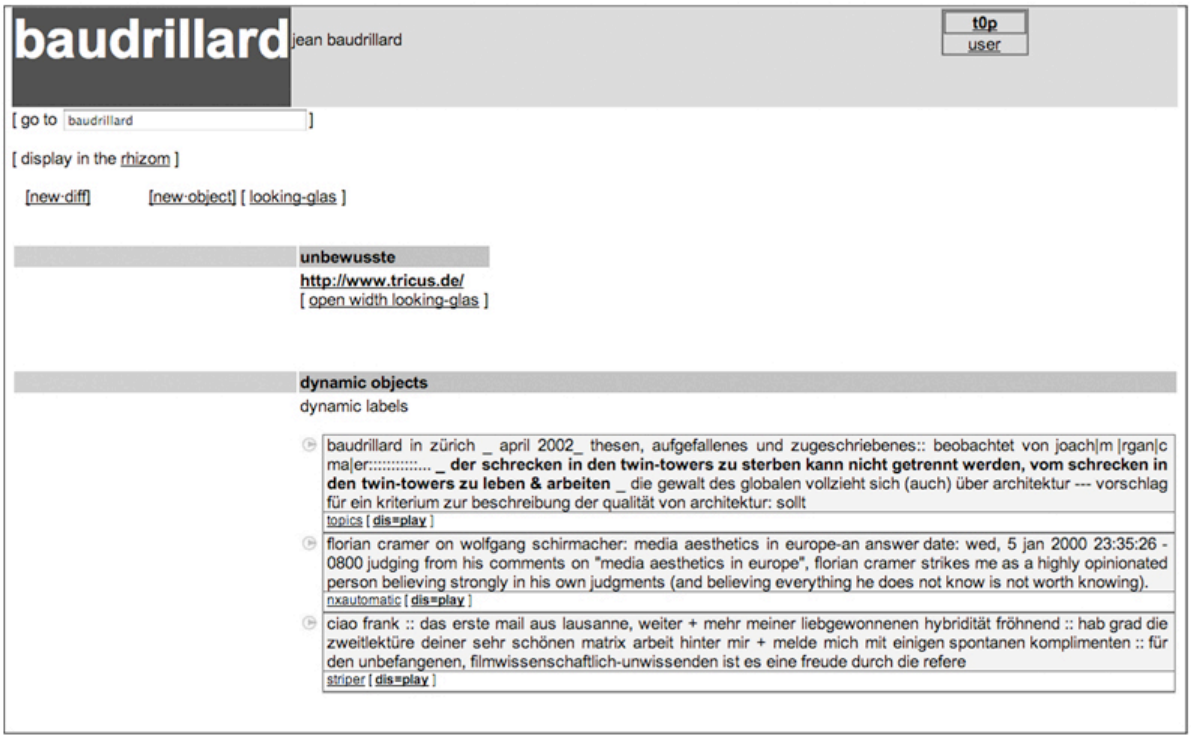
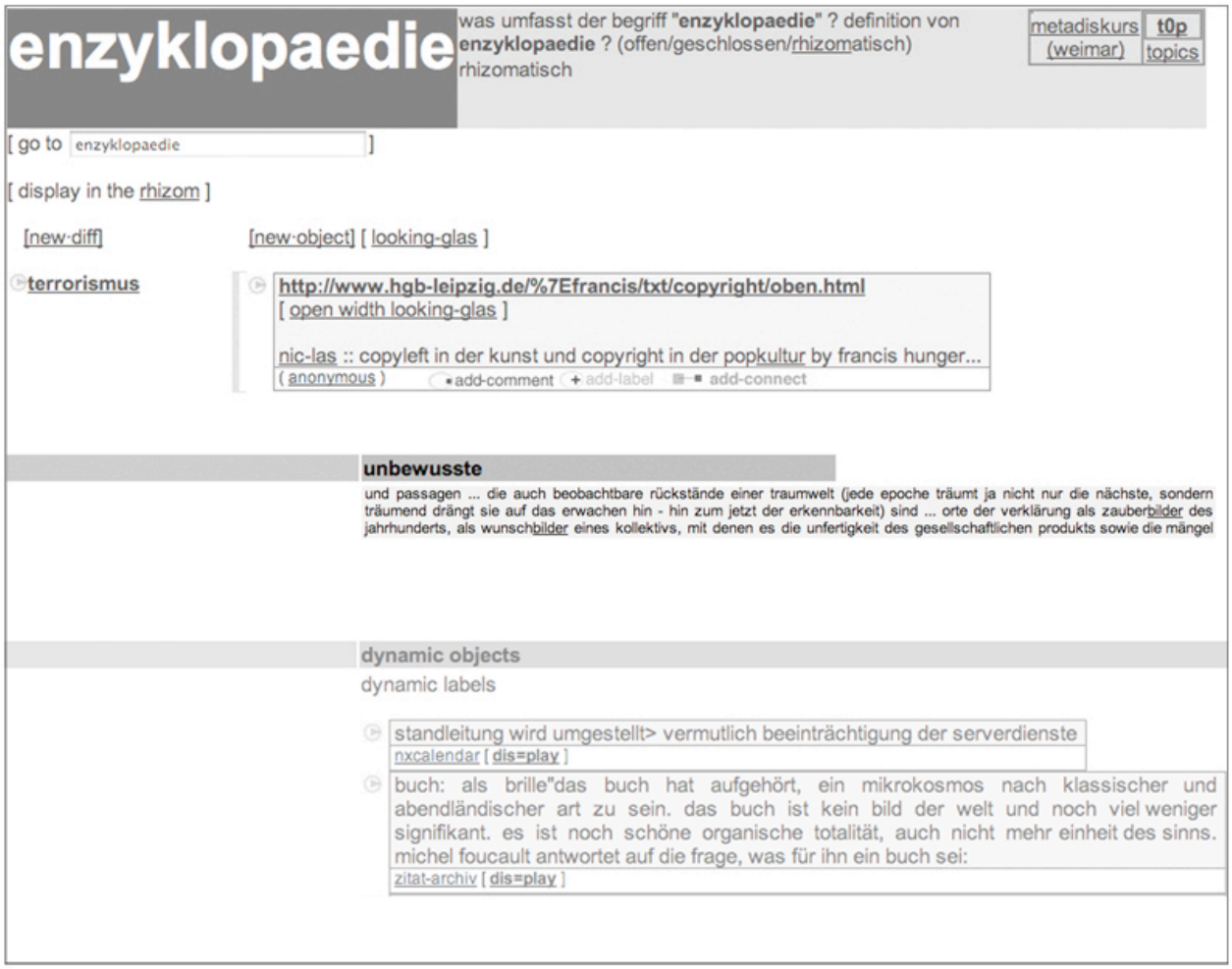
[27] Bauer, René and Joachim Maier, Nic-las, 1999 – 2005, <http://www.nic-las.com> (30.11.2005).



4.3 Subconscious (Endo)

The digital subconscious first was a playful approach on interaction between different texts. It was introduced as a joke on (post)modern theories but became a rather useful tool. Nic-las features different types of a digital subconscious. The digital equivalent of the "Freudian" subconscious (which was implemented first) is a media transposition of Sigmund Freud's concept of communication. If a user chooses to 'delete' a difference or an object (text, film, sound etc.), it will nevertheless be kept in a special section of the database. From time to time, the 'digital subconscious' will then bring parts of these deleted items back up to the surface. The subconscoius objects may appear as pop-ups, text inserts or as layers next to, under or on top of the text a user happens to be working on.



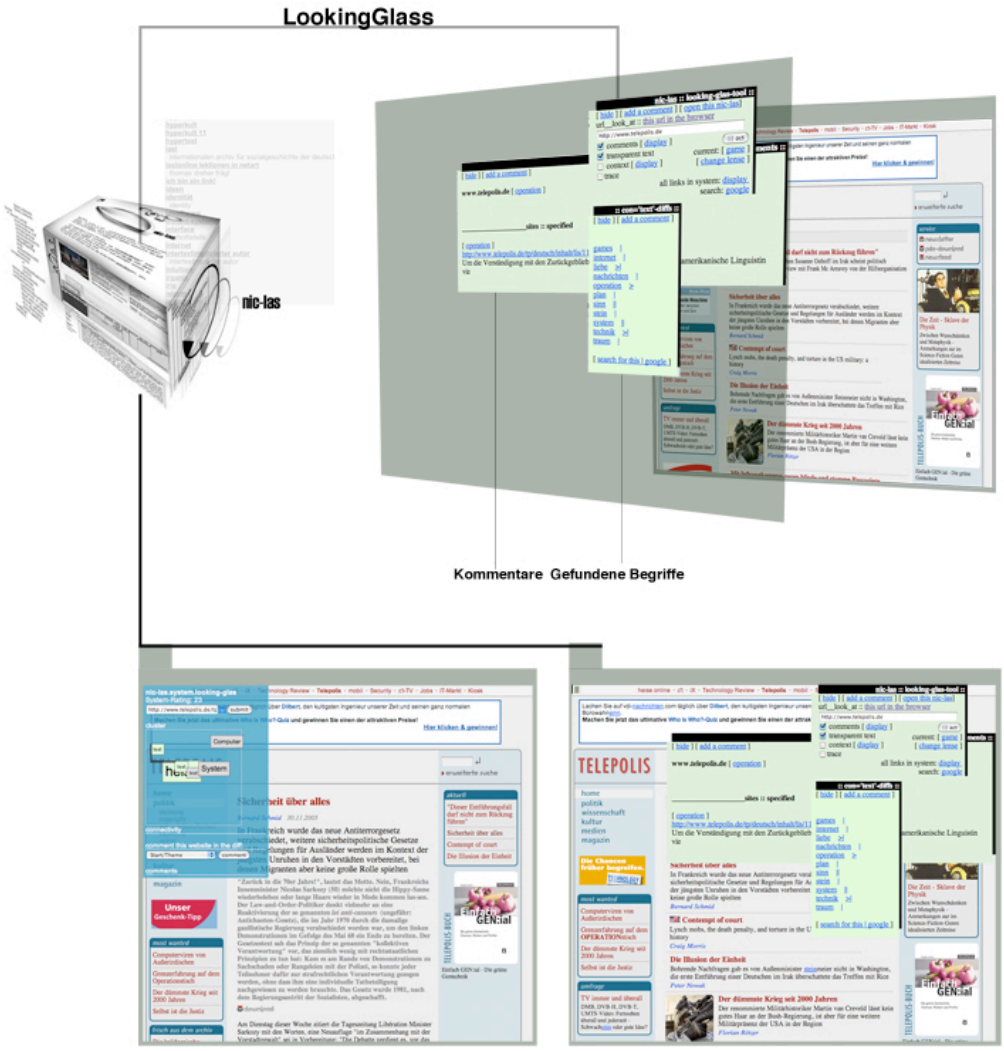
These subconscious objects are randomly assorted to an active difference (index card). A user may be irritated at first by the unexpected appearance of these lost objects, but he gets used to the unusual system operation quickly and may start to integrate it into his working process soon. If it matches subject and research, a user may be pleasantly surprised by a subconscious object; he may ask himself: "Did I write this? This is a good idea, I can work with it" and integrate it into the present text. If it does not fit, he can just as easily ignore it and dismiss it. Finally, besides the Freudian subconscious, Nic-las knows a Deleuzian subconscious as well. This Deleuzian subconscious washes up items stored in the community database. This type of subconscious is more efficient and has become the standard preference of Nic-las. The two concepts of the digital subconscious have been introduced as a transposition of theory into software; they have become extensions and operations of the system, which generate variation. The medium starts to participate in a work as an autonomous and concreative factor, upsetting deliberate arrangements.

4.4 LookingGlass (Endo/Exo)

While Nic-las thus offers an interactive storage and retrieval system which in itself is both dynamic and autopoietical, the question remains whether the system as a whole is closed off or whether it can interact with other systems and communities. Is there a way for users to break out

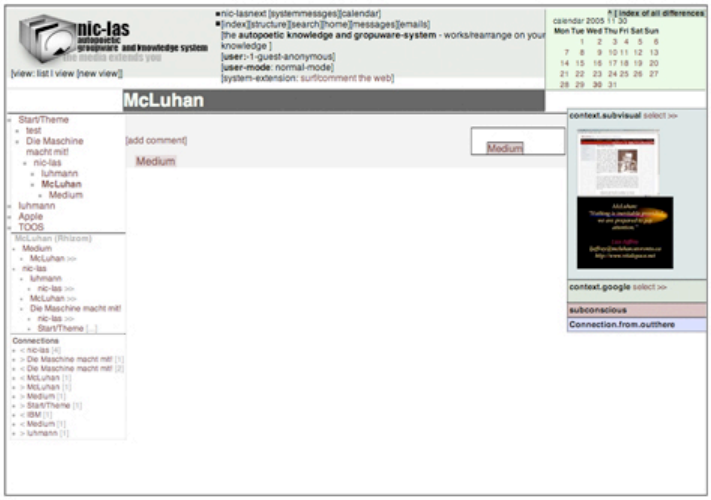
of the system and productively 'irritate' the community? How can a community be confronted with potentially conflicting meanings and discourses of other communities? One of the extensions of Nic-las that were designed for this purpose is LookingGlass; it enables the community to have a look at the world from inside the community, using its own values.

LookingGlass enables the user to surf the net, tag and grade websites, and comment on individual webpages. These markings and comments will then be available for other members of the community and again become part of the system. A user who surfs with the help of LookingGlass finds the terms, links and comments of his community right on the webpages he chooses; they show up in layers layed on top of an 'alien' webpage. The texts are linked back into the system. The web becomes visible through the glasses of the community. Users of the system are able to observe themselves while observing, and the community registers outside content and concepts according to its perception. LookingGlass thus changes the environment by using the community's values and writing layers on top of content (exo) which finally makes the community visible as a dynamic collaborative system.



4.5 Subvisuals (Endo/Exo)

While LookingGlass thus provides an extension which allows outside content to enter a system (and which will shape and control its perception), other forms and extensions were needed to expand and contextualize a system as a whole. Two extensions, context and subvisuals, serve this purpose: they will wash respective content from the net into Nic-las. For example, if a user works on the differnce "visualization", these extensions will start looking for context and subvisuals both for this term and for related concepts. The system will contextualise itself in the environment of Google's page ranking by suggesting related text and matching visuals.



This ensures that users of a Nic-las will get confronted with the meaning of a keyword in the net. A difference and demarcation between community-meaning and web-meaning is being developed. The exterior and the interior of a system can be overcome by a mere click which integrates text into the system. Subvisuals extend a certain difference in Nic-las and its structural position with visualizations by Google Image. Context and subvisuals are dynamic extensions to the system which anchor the differences in the general surrounding of the World Wide Web. These contextualisations with Google are only a first step; it is both possible and desirable to integrate further databases and applications into a system like Nic-las.

4.6 Search-engine extensions (Exo)

Usually, if a user searches and finds a website by means of a search engine his entry and the results of his search will be recorded in logfiles. These logfiles may only be evaluated partially or manually, and most of the logfiles will never be looked at. Nic-las is different in this respect: it features an extension which integrates search queries into its system. If a user of Google finds content in a Nic-las, the system creates a link in the respective difference and records the query for further use by the community. This system operation enables users to see that their knowledge is being used, even if the content in question is forgotten or neglected. Often, the community will

then take note of this content it has not been working actively on.

Nic-las offers communities more than just a medium for Computer Mediated Communication. If they so choose, they can use it as an extension, which actively participates in their work.

In conjunction with its users, Nic-las forms a new type of interactive medium which operates in intertwined, dynamic and concreative fashion. The whole is more than just the combined parts: Nic-las offers the model of an ambient intelligence system.

5. Future Systems

The term 'Ambient Intelligence Systems' was introduced by Philips in 1999 and has mostly been used in commercial concepts. Philips and other producers and developers of electronic comsumer goods are convinced that current inventions are about to make electronics 'smart'. Technological breakthroughs will also allow humans to integrate 'smart electronics' into more friendly environments. This vision of 'Ambient Intelligence' formulates the prospect of people living comfortably in digital environments in which "the electronics are sensitive to people's needs, personalized to their requirements, anticipatory of their behavior and responsive to their presence."[28]

The examples we have mentioned in our essay – netart, Google Art, game extensions and adaptive concreative systems – open up perspectives for dynamic ambient intelligent systems in commercial and non-commercial environments, amongst them the arts, videogames and creative processes like writing, design, music, and performance. The characteristics are similar to those of ambient systems: context awareness or context mining, adaptive spaces, personalization, immersion and possible variations.

For the last 100 years, a lot of effort has been put into eliminating the medium from the process of information transfer. We have only recently arrived in a time where the reproduction of text and messages is not the dominating problem anymore: "Today, we are dealing […] not with identical reproduction anymore but with changed reproduction, with variety and creativity."[29] The systems we are developing are not just designed to reproduce objects and information but to produce sets of variations users can interactively choose from. In Nic-las, for example, such interactive tools of variation exist in the Looking Glass extension. These systems can work on the basis of communities like Nic-las or on the basis of concreative and subconscious interfaces like Streamfishing. The selection of streams that are made visible or connectible (and therefore usable) will help to further develop dynamic and concreative media and develop new concepts

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[28] Website Philips Research Technologies, 1999 – 2005, <http://www.research.philips.com/technologies/syst_softw/ami/background.html> (30.11.2005).

[29] "Heute geht es um das Gegenteil davon – eben nicht mehr um identische Reproduktion, sondern um veränderte Reproduktion, um Variation und Kreativität." Our translation; the original quote in German is taken from an interview: Hartmann, Frank and Klaus Taschwer, "Zurück zum Gespräch, Ein Interview mit Michael Giesecke über kollektive Wissensproduktion, das Medium Buch und die Rolle des Autors", in Telepolis, 1999, <http://www.heise.de/tp/r4/html/result.xhtml?url=/tp/r4/artikel/6/6377/1.html&words=Giesecke%20Hartmann> (30.11.2005).

with new facets and new ways of integrating software and people. This software should help us adapt better to the changing preferences and environments. This way software becomes a new adaptive or permeable skin of information which wraps around our bodies. It will be a cover which has change already woven into it as a likely possibility. Skinlike extensions like this might be able to dampen the fights between old and new and master difficult cultural processes, since they have internalized change as an opportunity rather than a nuisance and make it visible and usable for everyone. This means that these extensions as well as the changes are not perceived anymore as parts of something else but as parts of ourselves.

With the invention of the computer and computing programmes the history of interaction has taken a radical turn. The computer may be looked at as the realization of the old desire of creating a depiction of a human being as a vis-à-vis that is able to act and interact by itself. What was created so far has become a simple vis-à-vis, which acts on the bases of logic and cybernetics. As a model for our alter ego we use a mathematician with pencil and paper (according to Turing's concept of an universal machine) – or as a friend recently noted: a bookkeeper with pencil and paper. In the past this bookkeeper was mostly used as a mediator, someone who stands between the interactors but has to remain invisible under all circumstances: a medium with a name but without a particular meaning. It was his job not being seen by any participant and not causing any disturbances, which would have revealed his person; it was his job to pass on any data – and interaction was nothing but predictable communication. Today's media have to go one step further, they need to integrate the bookkeeper and render him into an active participant. Projects like Nic-las are demonstrating this – but they are only a start. Communication and interaction may become concreativity[30] by which a human being extends himself and finds via interaction with his own models more than just himself.

After all, the Gutenberg galaxy comes to a closure when standardized producers and consumers communicate with each other as servers.

Note from the authors:

This essay was written in November 2005 for a volume on „Interactivity of Digital Texts" that was to be published in Rodopi's Critical Studies series. Editors were Christian Krug and Joachim Frenk (Münster, Germany), the main editor for the volume was Myriam Diocaretz, Amsterdam. Unfortunately the collection of essays was never finished and published.

Origin for this text was a lecture by Beat Suter and René Bauer at the International Conference "Interactivity of Digital Texts", that took place at the University of Münster, Germany, May 20-22, 2005. The conference was held at the Haus der Niederlande in Münster and was organized by the English Department of the University of Münster, Dr. Joachim Frenke, Dr. Christian Krug and Katrin Althans. <http://www.uni-muenster.de/Interact/conference.html> (24.05.2005).

[30] Mathez, Judith: Hier bitte selber weiterschreiben! Konkreativität als Kategorie digitaler Literatur. In: dichtung-digital, Newsletter March 2002. <http://www.dichtung-digital.com/2002/02-25-Mathez.htm> (30.11.2005).