

Shades of Virtuality

From Virtual Reality to Mixed Realities – From Being to Becoming

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Abstract

Virtual Reality (VR) means the mechanization of perception, a translation of the natural senses into telematics. Interfaces such as data glasses and data gloves seem to invite us to immerse ourselves in virtual worlds in order to "grasp", "touch" or "be touched". Is that true what we feel? With the shutdown of the Arpanet in 1990, the commercial phase of the Internet began. The Internet, a networked data space, also called cyberspace, first develops into a new public realm of global communication and later into a medium of absolute control, a huge virtual mirror of real events and the home of big data. In this context, VR technology is experiencing a renaissance in the past 10 years. With data glasses now being praised by industry as the ultimate choice and with the promise of developing superior immersion. What is it about? Imagination, simulation or exploring of new knowledge? Is it self-optimization, is it brain hacking or is it even about stealing our brains? How can new knowledge emerge through shades of virtuality? It is not the immersion in a virtual environment that is important, but the actual experience of memory landscapes that symbolise ideas and at the same time offer performative methods of reflection. The Art of Memory and Mixed reality can possibly do better than VR. To keep pace with the growth of data knowledge, performative interfaces are necessary to keep the mind alert and shake the memory.

Keywords: Art of Memory, explorative interface, immersion, Mixed Reality, Virtual Reality

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In this article we sketch the development of the concept of virtuality and immersion, from early artistic approaches such as Myron Krueger's Responsive Environment (1972) to contemporary Virtual Reality (VR) and Mixed Reality (MR) art and raise the question: How do the ideas and visions of the early VR pioneers differ from today's immersive environments? What are the concerns of today's artists of the globalized world? We write about it in the context of mixed reality concepts of our own works to learn by distinction and start with the development process of artistic VR on the basis of selected characteristic works.

Today's mostly euphorically announced exhibitions in Europe, Asia and the USA show that little or no knowledge of this first phase of virtual art is present. It seems as if a technology trend that has been excavated again is to be sold here without reflection as the latest invention. In Germany, VR has gained a new level of public awareness since Jaron Lanier - computer scientist, musician and author - was awarded the Peace Prize of the German Book Trade in Frankfurt in 2014. Lanier's acceptance speech fluctuated between fear and optimism. Meanwhile he criticizes digital capitalism like many of us artists-scientists. In the late 1980s, he contributed to the development and marketing of virtual reality applications with his company VPL Research. At that time we had just started our research work, had founded Art+Com and cooperated with VPL. Our computer scientists, Dirk Lüsebrink and Henrik Tramberend, added a special radiosity software to Lanier's VR software, so our software was the only one at the time that could create light and shadow in realtime and thus the special mythical atmosphere in our VR installation "Home of the Brain" could be achieved.

While our spiritual virtual 'mentor' at the time, Vilém Flusser, was pleased with the new interconnected space that later became the Internet. This situation might have changed and Flusser would accompany it even more critically today. In an interview from 1989, Vilém Flusser was talking about the boys and girls connecting via reversible cables, turning their backs on politics to talk to each other and make their own policies. Flusser emphasized that the digital phenomena produced by computers are aesthetically appealing and argues on the shared German etymology of 'Schein (apparition)' and 'schön (beautiful)'. He also comments on the tendency "to distrust these synthetic images" and suggests that the main reason is that 'they are worlds that we ourselves have designed, rather than something that has been given to

us, like the surrounding world'. What we are and how we should live is up to human beings themselves to ideate, describe and compute reality, says Flusser (1996). Today the once lonely boys from Silicon Valley praise communication via virtual social networks, which could be experienced even better via head-mounted displays. This luridly propagated retreat from reality and into virtual isolation makes us think about the future of Virtual Reality. But first, we take a brief look at the motifs of virtual art of the early 1990s and the years before.

Already in the mid-1970s, computer scientist and artist Myron Krueger established an Artificial Reality Lab called the Videoplace, that placed the users within an interactive environment, and responded to the users movements and actions, without the need of wearing heavy technology. "Small Planet", a Videoplace technology project, was shown in Madrid's Metro Station Opera 1994 in "Arte Virtual", a great show curated by Rafael Hemmer in Madrid 1994. The exhibition with sixteen artists from eight countries presented technological art in an old, abandoned metro station under the Madrid Opera House. Apart from Krueger, the exhibition featured Daniel Canogar, Monika Fleischmann & Wolfgang Strauss, Sharon Grace, Pedro Garhel featuring Isidoro Valcárcel Medina, Jeffrey Shaw, Nell Tenhaaf, Christa Sommerer & Laurent Mignonneau, Mario Canali, Catherine Richards, Esther Mera and Trimpin. (www.facebook.com/errafael/posts/10155478851580017). In Krueger's installation the attendees queued up and held their arms like children pretending to fly. That was not necessary at all, but the misunderstanding about how to manage the interaction led to a cheerful communication among the visitors. Together they flew over the 3D planet. Similar further works are Camille Utterback's "Texttrain", 1999, in which participants use their bodies, to play with falling letters.

1977: The Satellite Arts Project (Galloway/Rabinowitz) was a performance in a space with no geographic boundaries. Several performing artists, all separated by oceans and geography, appear and perform together - for the first time - in the same live video image. Galloway and Rabinowitz describe the electronic image as a living, immersive place: "a performance space with no geographic boundaries" and a "new way of being-in-the-world". (www.ecafe.com/getty/table.html). A further work is „Telematic Dreaming“ by Paul Sermon (1992). Here, a bed turns into a carrier of high-resolution images that bring a distant partner into intimate proximity by virtual touch. This work plays with physical presence and telepresence.

In "The Legible City" (1988-91) Jeffrey Shaw travels on a stationary bicycle through the streets of a narrative city of letters and words about Karlsruhe, where he headed an institute back then. Visitors to "Berlin, Cyber City"(1989-90) by Monika Fleischmann &

Wolfgang Strauss exchange memories and ideas for the future of the formerly divided city by travelling through 3D urban space with a button-sized sensor, that we painted eyes on, via the map.

1991: How can you depict the body without portraying it? In "Home of the Brain" (Monika Fleischmann/Wolfgang Strauss) the visitor becomes immersed in a discourse on the future society by moving through four philosophers' houses and their opposing positions represented in words, voices, sounds, colours and forms. Luca Farulli, who teaches Aesthetics of Digital Art, concludes: „So here comes back the voice which enlivens a mental image, a phantasm, allowing the viewer to imagine the body which comes with that voice.“ We are far from simulating an objective reality, instead we seek out for interconnected concepts and for subjective perception. Farulli observes: „Here the viewer becomes the actual performer, who gives form to the knowledge contained in the installation, experiences it in a participatory way, managing and recomposing the knowledge disintegrated into fragments, into circulating, dispensed quotations.“ (Farulli 2011).

1993, in the „Simulation Room of Mobile Data Sound“ (1993) by Knowbotic Research the users' hand movements produce an audio-visual collage from prepared database material. The Knowbotics were also supported by our newly founded research group MARS in Sankt Augustin, but even more from computer scientist Georg Trogemann at the Academy of Media Arts Cologne (KHM).

In 1995, Char Davies, a founder of Softimage, immerses the visitor with „Osmose“ in a VR underwater environment by using a special vest with breathing and balance sensors. Davies had a whole team at Softimage at her disposal for one year to produce her work.

1993: "A-VOLVE" of Christa Sommerer and Laurent Mingnonneau is a metaphor for artificial life, evolution and gene manipulation. Visitors create virtual creatures that fight for survival in a water pool with a tablet for drawing. The work was supported by the ICC IntercommunicationCenter NTT, Japan and the NSCA, National Center for Supercomputing Applications, Illinois, USA and it was realized at ATR Advanced Telecommunications Research Lab, Japan. This should be said in order to understand how complicated it was to produce such works at that time and how much support was needed.

1997: "World Skin" of Maurice Benayoun takes us on a "photo safari" into the Land of War. Armed with cameras, visitors move through a 3D space in a CAVE: Visitors are asked to "shoot" souvenir photos, whose object is thus removed from the virtual world skin.

2001: "Body Movies" of Rafael Lozano-Hemmer relates to Shadow Dancing in public space. Thousands of pictures of people, who were previously here before are invisible projected by robotic lights on the façade of the houses. As soon as a shadow of a visitor falls on the wall, the portraits are revealed within them and a sense of intimacy and memory evokes.

2003: In "Listening Post" of Mark Hansen and Ben Rubin, viewers are immersed in a sonification and visualization of thousands of simultaneous conversations happening in chatrooms and newsgroups on the internet at that moment in real-time. Statistical analysis organizes the messages into topic clusters. A soundscape underlies the spoken text, its pitches and timbres responding to changes in the flow and content of the messages.

2005: The "MILKproject" of Ieva Auzina, Esther Polak at RIXC, is about the producing and transportation of cheese from Latvia to the Netherlands from the cow to the consumer. All the people involved in this transportation—from farmer to consumer—were given a GPS device for a day. The GPS visualizations were explored as a storytelling tool. All have learned about the other partners in the production and transportation line, especially about the interrelationships. The individual partners have become a connected community in which appreciation of others and self-esteem have grown.

To put it simply, during the period of one generation (1980-2010) there is first an increasing movement into virtual realities, which then reverses through the use of virtual techniques to experience real space for real living in mixed realities. On the basis of the examples presented, we can see that the main idea of virtual reality is losing importance: the immersion of the viewer in a three-dimensional, virtual environment. On the other hand, interactivity and participation in virtual spaces that are anchored in real space are gaining importance. (Fleischmann & Strauss 2008) Initially, the virtual environment consists of geometric objects or smaller model rooms. With the advent of the Internet, satellite eyes in space, mobile phone data recording our movements, data virtuality manifests itself in physical space and all kinds of surveillance have arisen. Data tracking is possible as we already predicted with our touch screen in "Liquid Views" (1992-93). With the consequences of data surveillance of almost every one of our movements we must live today as long as this parallel world is not better protected by rules of our governments. It is only the excitement surrounding Facebook that is causing European and American governments to concern themselves with the data protection of their citizens.

Introduction to Mixed Realities

Everyone lives in a slightly different reality, because we create our own orders and patterns through mental grids and experiences. Thus the psychologist Paul Watzlawick explains in "How Real is Real?" (Watzlawick 1976). why the so-called reality is actually an extremely subjective concept. In doing so, he takes up Erich von Glasersfeld's theory of radical constructivism and popularizes it.. The communication scientist is regarded as the founder of this theory together with physicist, Heinz von Foerster. According to Glasersfeld the basic principles of radical constructivism are: 1.) "Coming to know is a process of dynamic adaptation towards viable interpretations of experience. The knower does not necessarily construct knowledge of a "real" world" (Glasersfeld, 1990), 2.) "Knowledge is not passively received either through the senses or by way of communication, (...) rather knowledge is actively built up by the cognizing subject." (Glasersfeld, 1991a, p. 233). 3.) Watzlawick adds that knowledge is created in interpersonal relationships by the thinking subject. Instead of perceiving reality objectively, we are constantly interpreting it. So reality is always what we think it is and that depends on our personal interpretation. Seeing is constructing. We construct our reality and thus always live in mixed realities. In this and the following chapters we will discuss the concept of Mixed Realities in the context of our artistic work.

Starting from the question whether VR can be a dimension of the real world or whether total immersion keeps us away from reality, we have developed our Mixed Reality paradigm over the past 30 years. Our goal is to use interactive settings to establish a situation in which participation creates the possibility of construction -not of reality- but of knowledge. This requires an interactive system architecture that is flexible enough to overcome the often limiting character of interactive artworks in order to become an open space for activity. The interactive set of rules constitutes an open framework for action. In this process, the people perceive individual options for action and this is exactly where immersion takes place. In contrast to a technical understanding of VR, we call this situation of an acting human body a virtual reality, in the original sense of the term. Being tired of the clichés of disembodied transcendence and frozen progress in the head-mounted display and other Virtual Reality interface technologies, we prefer a flowing fusion of reality and virtuality. We see the market-oriented VR concept as something static that is trapped in the present and as an expression of a consumer culture. In contrast, our mixed reality environments constitute a becoming, a dynamic process representing a producer culture. Therefore our mission statement is: From being -- associated to Virtual Reality as the illusion of being there -- to becoming -- to

processes of development and participation, which we refer to as Mixed Reality – the same as life is being a process of becoming.

The Mixed Reality Condition - a Body-Environment Relation

While the commercial VR concept is based on pre-programmed effects and can be described today as 3D cinema, we understand MR as an interactive, audiovisual space for action. The term "mixed reality" does not refer to the technology-oriented taxonomy (Milgram 1994) but rather to a concept of superimposition of physical reality, digital artifacts and the acting subject. (Strauss 1999 p. 93)

The renowned literary scholar Mark B.N. Hansen discusses in "Bodies in Code" (Hansen 2006) our MR concept using as examples our works "Rigid Waves" and "Liquid Views" (Fleischmann et al 1993). Both works focus on the Narcissus of the media age, long before smartphones and selfies existed. How to see the world through a liquid mirror that questions our normal perception? (Fleischmann & Strauss 1995). Hansen studies the structure of the interactive settings with – the first – self-built and programmed touch based screen (Liquid Views 1992-93) and a distance based screen (Rigid Waves 1993):

„If this means that the "mirror becomes the actor," it acts necessarily in conjunction with the embodied spectator, whose immersion in the situation by the self-reflexivity of touch as the most primordial of the senses, as the root of premodal sensation". And further Hansen distinguishes: "What makes these two works singular in the present context is the way that they support the opening of virtual reality not as a technical apparatus (...) but rather as a technically triggered experience of the organism's power of imaging.“ (Hansen 2006, p. 20).

Mirroring always means self-reflection in some way, even if the production of a selfie is more related to perform in the best possible pose. Selfies state a past presence of the self while mirror images of "Liquid Views" point out the unknown self. Michael Joyce, author and critic of electronic literature, describes this issue in our work as the "nowness of the self" (Joyce, M. 2000) and we ‚translate‘ this as an exceptional presence. "Liquid Views" tells a story about self-reflection, about ubiquitous surveillance and performative presence. The visitors are the main protagonists, as they literally leave their impressions like a DNA, as personal photos stored on the artwork's hard-disc. In both performances, "Liquid Views" and „Rigid Waves“, the mirror becomes an actor and thus a respondent. And above all, the mirror

shows images as stored moments that otherwise remain in the unconscious and never become visible (Fleischmann & Strauss 2015).

Hansen emphasizes how the two works exemplify open participation, experience triggered imaging and sensory commons:

Indeed, if we take the experience of Rigid Waves and Liquid Views as exemplary of this phase, we can immediately comprehend how digital technologies, as the contemporary expression of the originally technical mediation of the human, broaden what we might call the sensory commons - the space that we human beings share by dint of our constitutive embodiment. This is because digital technologies 1.) expand the scope of bodily (motor) activity and thereby 2.) markedly broaden the domain of the pre-personal, the organism-environment, coupling operated by our nonconscious, deep embodiment, and thus 3.) create a rich, anonymous "medium" for our inactive co-belonging or "being-with" one another, which thereby 4.) transforms the agency of collective experience (of individual and collective individuation from a self-enclosed and primarily cognitive operation to an, essentially open, only provisionally bounded, and fundamentally motor, participation. (Hansen 2006, p. 20).

We find these characteristics essentially already in historical models of virtual knowledge spaces: physical (motor) activity in the domain of the organism-environment coupled with collective experience. From memory theatre to self-organized data spaces, historical concepts of virtual space are metaphorical models for the interactive networked knowledge space. Brenda Laurel, an author, designer and researcher of interactive media, asks in "Computers as Theatre" (Laurel 1991) for an interface design that takes dramaturgical aspects into account and does not only think of usability. She compares the computer monitor with a stage that puts the user at the center of the action. With her theatre "as an interface metaphor" she follows in the footsteps of earlier models of knowledge stores and memory spaces.

The Italian philosopher of the 16th century, Giulio Camillo, cherished a vision of a universal storage and retrieval system. Camillo is best known for his "Theatre of Memory", which was long forgotten and has been rediscovered since the 1960s. Inspired by Ernst Gombrich, director of the Aby Warburg Institute, the British historian Frances A. Yates wrote about Camillo and "The Art of Memory" (Yates 1966). Aesthetic theorist Peter Matussek notes that Yates book and her findings influenced video artists like Bill Viola and later many artists of the digital media age as well as us. Camillo was concerned not only with the

ordering of knowledge (Dispositio), but also with the invention of knowledge (Inventio). In his memory theatre the viewer stands on the stage, and the knowledge of the world is to be seen in images in the rings of the theatre, in the manner of an encyclopedia. Camillo 'wanted images that projected the visitors to his memory theatre into a state of inner activity'. The goal was 'to find ... an arrangement that is received attentively by the intellect and jars the memory', Matussek reports (2011). Camillo's work had been rediscovered at the Warburg Institute for a good reason. The German art historian, Aby Warburg has also dealt with the knowledge of the world at the beginning of the last century.

How do you store the world? With this question in mind, Warburg explores the knowledge and critical interpretation of contemporary visual culture. From 1924 to 1929 he creates his atlas Mnemosyne in the Hamburg library, not on the basis of the chronological and logocentric order of 19th-century historicism, but on the basis of the recognition of the density of meaning and expressiveness of the images, which are capable of destabilizing the epistemological patterns of art history. Aby Warburg's "space of thought" [Denkraum] is based on the thematic grouping and regrouping of images of works of art, newspaper clippings and press photos as principles of his art of memory as media scholar Martin Warnke (2000) found.

For capturing all human knowledge, the Swiss art brut artist Armand Schulthess gradually converted his large garden from 1951 to 1972 into a comprehensive artwork. He inscribed thousands of texts on to small, circular lead plates, suspended in the trees of his garden and some things can still be seen there today. An encyclopedia in the woods of the Ticino, the Italian part of Switzerland (Schlumpf 1989 p. 222).

For our own work on the "Semantic Map" (2004), to organize a lot of data and documents semantically, we started our research in 2003 in the area of computer science. We explored the principles of the Kohonen map, an artificial neural network for a semi-automatic text analysis, which was developed by the Finnish Engineer and researcher Teuvo Kohonen (1995). But already at the beginning of the 1990s artificial intelligence (AI) researcher Marvin Minsky had inspired us to think about how the documents of a digital archive could be interlinked. He envisioned new computational tools and talked about books that 'speak' with each other, because they 'know about each other'. Speaking from the future one book says to another: "Can you imagine that they used to have libraries where the books didn't (even) talk to each other?" Minsky said 1990 in an interview at the Ars Electronica in Linz. We were enthusiastic about this idea and at that time we integrated that phrase into Minsky's home in "Home of the Brain".

Camillo's Memory Theatre, Aby Warburg's Space of Thought, Armand Schulthess's Garden of Knowledge, Teuvo Kohonen's Map and Marvin Minsky's talking books are core design patterns for knowledge discovery systems as our Semantic Map. Also, they are blueprints for real-world interfaces, which need to be narrative and evocative in order to attract a large audience. Today's Memory Theatre [Gedächtnistheater] is an interface that is based on algorithmic operations. Following the organizational system of Giulio Camillo, who fights against the loss of the medium body in his "Teatro della Memoria", we plan the same by using the interface to place the participants into a flow sensation. Information is semantically concentrated, the gaze is staged by way of lines of vision. The interface becomes an operative image that stimulates perception for the construction of (new) knowledge.

The configuration of the interface is decisive for access to the data structure and is defined by two design patterns:

- 1.) The participants are in a space filled with data and in a network of connections that react to any kind of movement.
- 2.) The participants can metaphorically permeate the thoughts of others, expressed as physical, gestural or vocal expression and thus come into contact.

The digital data structure produces an atmosphere of symbolic, immaterial as well as concrete elements, e.g. visual signs; sound, voice or discourse; body movement and perception of environment. This complex situation forms a stage for data and data performers (Fleischmann & Strauss 2011).

Our performative stages for such performances, "Murmuring Fields" (1998), "Energie-Passagen" [Energypassagen] (2004) or Medienfluss [Media Flow] (2006), to be explained later, are exemplary for this description. The new Memory Theatre is like a stage play of different people such as children, teenagers, ladies, men, foreigners, artists, critics ... and the rhetorical figures of the interface. In other words, here searching and finding is a performative act of knowledge creation. This form of communication is made possible by an explorative knowledge interface that appears fluid and unsharp. The interaction with the digital is perceived as a flow experience in which thinking and acting take place in real time (Fleischmann & Strauss 1998). Our vision of the explorative interface of the mixed reality environment is in line with Sybille Kraemer's concept of operative imagery: "In operative images it is not only a question of representation. They open up the possibility of the instrumental or reflexive relationship to the depicted, it is a matter of constituting the image" (Kraemer 2009 p. 94). We extend this concept because the mixed reality interface environment described below is an audio-visual image space. This exploration-promoting

interface conveys additional knowledge, which is not part of the data structure, but which only arises in the communication process with the mixed reality environment.

Mixed Reality Explorations

From virtual to mixed reality, our work evolves as a movement from being to becoming. With the founding of ART+COM (1987), we are Germany's first independent institute for new media. We are equipped with Silicon Graphics computers and the VPL equipment, such as a data glove and the head mounted display. At this time there is no Internet yet and few scientists and hackers use e-mail. After the first experiments we put the data glasses aside, because after the fall of the Berlin Wall (1989) we are not interested in escaping reality - in Berlin.

Instead, we are building an East-West meeting point "Berlin - Cyber City" (Strauss & Fleischmann 1991). Here the traditional VR-interface becomes a scenic arrangement of an interactive table with a city aerial photo placed in front of a large display. The position sensor - taken from the VR data glove- enables for a virtual walk in the aerial photograph, the corresponding three-dimensional city image appears on the screen in real time. The interactive table becomes a place where the formerly alienated citizens of the divided city meet for joint walks through the city - and get together for a conversation. The virtual city is visited exclusively in real space. The viewer becomes an integral part of the installation. The virtual walk is a passage through past, present and possible future, i.e. leading through the digitally reconstructed underground tunnels, which were painted with murals from the Nazi and Stasi periods, as well as through simulated future buildings of the still empty city center in the area around the death strip. The viewer becomes a co-creator of the interactive environment. New media arts theorist and curator, Ryszard W. Kluszczyński comments on the project: "Berlin-Cyber City installation suggests to its users hybrid experience of an extended reality, interactive peregrination through time and places. (...) As a result, perceptive experience of Fleischmann and Strauss installations takes transgressive shape; it is an activity overtaken in one environment but bringing effects in another, and the results reflexively are coming back to the functioning interactors, building a developing context of interactions, motivating their further behaviors and co-creating in this way, the structure of interactive work event. (...) Berlin-Cyber City has these features already developed to the very defined grade." (Kluszczyński, 2011).

While "Berlin - Cyber City" (1989) shows the new territory of the reunited German city, which also frightens some people especially from abroad, the Virtual Reality installation

"Home of the Brain" (1989-91) illustrates the new areas of reflection with new media. With data glass and data glove, the viewer dives into the ideas of leading media philosophers and scientists, into topics still little known to the people. It is our intention to communicate these unknown topics in a kind of public, virtual exhibition of theoretical concepts. By snail mail we ask the intended inhabitants of "Home of the Brain" if they would like to live there virtually. Joseph Weizenbaum, creator of Eliza, the first artificial intelligence program to simulate a virtual psychotherapist, is concerned about the power of the computer, but he agrees with the House of Hope designed for him. In a handwritten letter in french, Paul Virilio warns against the frenetic standstill and very nicely writes we should simply use his texts to build his House of Disaster virtually. Marvin Minsky, the leading researcher in Artificial Intelligence, replies that he is looking forward to seeing his House of Utopia. Vilém Flusser asks in a typed letter, filled with punched characters, how he could set up his virtual House of Adventure. Enthusiastically he wants to participate immediately. Unfortunately, he died a few weeks later, November 1991, in a car accident on the way back from Prague. His wife Edith (1920-2014) survived the tragedy and later she sent us another text he wanted to give us so that we could do further work with it. For visitors equipped with traditional VR equipment data glass and - glove, the virtual presence of the metaphorical houses of thought creates a feeling of participation in a discourse of ideas exhibited as words, signs, colors and voices.

By invitation of Philipp Quéau, then research director at the Institut national de l'audiovisuel (INA) and founder of the Imagina, we present both projects for the first time at Imagina in Monte Carlo in 1992 in a lecture entitled: "Virtual Walk Through Berlin - Visiting Philosophers' Houses in A Virtual Museum". "So far it has not been possible to stroll through the thoughts of others," media theorist Derrick de Keckhove, director of the McLuhan Institute, then commented appreciatively in Monte Carlo. In the same year, 1992, we receive the Golden Nica for Interactive Art of Prix Ars Electronica for "Home of the Brain".

Kluszczyński comments on "Home of the Brain":

Characteristic for the previously discussed installation, hybrid, real-virtual reality of transgressive interactions becomes here replaced by virtual reality (...). But even in this case, artists managed to the certain extend disrupt clearness and homogeneity of this work's environment.

Kluszczyński made clear:

"Even more important, because consciously and with premeditation chosen by artists, hybridizing feature of this installation is organization of the virtual worlds around the thoughts of four philosophers (...), whose concepts on the

subject of modern culture determine the map of its interactive experiences. The virtual environment of the work becomes in this way a space for philosophical reflection, and its synaptic character" (Kluszczyński, 2011).

In "Berlin - Cyber City", the discursive interface allows a group of people to communicate - with the restriction that one person navigates as it were the travel guide. The setting and the resulting discourse is what we call in this case mixed reality produced by the group. In "Home of the Brain" the inclusive VR interface allows a self-talk, so to speak, visible as body movement which bystanders can follow. The sequences of images created by the movement in virtual space are projected onto an exhibition wall with the silhouette of the navigator, so that the surrounding visitors can follow the events. The respective navigator is the producer of the action.

With the project "Murmuring Fields" (1997) we expand "Home of the Brain" - into a public, networked environment for several people acting simultaneously on a real and virtual stage. The participants' real stage - an empty room stage and a digital stage on the Internet - are connected via optical tracking. Real and virtual space are superimposed, the movement of the visitors is recorded by a sensor camera. Finally, the actors move into a room that is filled with data. Words, syllables and sounds are mixed by body movement. It is not the music that determines the dance, but movement that creates the sound. In a dynamic cycle of movement and reflexion, body communication appears in real time. The interface becomes the operative picture. Nobody needs an explanation on the Mixed Reality stage. Everyone will find out for themselves what to do.

Basically, all three installations - "Berlin - Cyber City", "Home of the Brain", "Murmuring Fields" - allow almost unlimited interactivity due to their composed and fragmentary structure (Strauss & Fleischmann 2003). A significantly extended interactivity and thus a different perception allow our projects in the period starting from the year 2000. Instead of a staged arrangement of composed data, the data basis is now semantically structured and generated live from the Internet. As part of the CAT - Communication of Art and Technology (1999-2004) research project, (Fleischmann & Strauss 2005 a) we are developing the "Semantic Map" for knowledge exploration. The "Semantic Map" is a dynamically generated map for navigating data spaces. It arranges related content within graphic clusters, where spatial distances and proximities represent semantic relations. The interactive map for the discovery of knowledge is an early practical example of semantically networked data based on an artificial neural network (Fleischmann & Strauss 2011 a). The web-based archive and learning platform for media art and digital culture "netzspannung.org"

was part of the outcomes of the CAT project. On the occasion of an award ceremony for our "eCulture Factory" Bremen lab (Fleischmann & Strauss 2005 b) in November 2007 we hand over the platform netzspannung.org with Semantic Map, Media Flow and other interfaces to the ZKM | Center for Art and Media Karlsruhe. Director Peter Weibel enthusiastically explains to the guests that "netzspannung.org" offers "firstly a new data structuring, secondly new interfaces as access to the data. Both are pioneering achievements." (Fleischmann & Strauss 2009, p 120)

At the time the "Semantic Map" was activated as an interactive data map, in 2003, Google presented a similar tool called Knowledge Graph. In contrast to the "Semantic Map", which can semantically correlate 500 documents, the Google results can be seen in the form of known search lists with a limitation to only a few semantic links. Thus, for example, certain topics such as Martin Luther and the Reformation could be presented in their thematic relation in rough contexts. At first, the idea of semantic networking of information determined the growth of data stocks on the Internet during this period. However, while we had the better accessibility of archives in mind, Google and the NSA share other tasks. Google evaluates semantic connections of data for commercial purposes such as advertising. The NSA researches and develops the semantic connection of digital communication for control and monitoring purposes. Be that as it may, the semantic networking of data enables us to realize our most extensive media art project, "Energie-Passagen" [Energypassages] (2004), with the help of the Munich Cultural Department and the cultural advisor there, Lydia Hartl. Energie-Passagen is described in the following section and in it all our previous insights into interactivity are incorporated.

Energy Passages – Reading and Writing the City

This section describes and theorizes the media art project "Energie-Passagen" [Energypassages] which is an interactive visualization of daily news in public space. With the interactive installation we implement the daily news as an audiovisual flow of information on the square in front of the House of Literature in Munich, Germany (Strauss & Fleischmann 2005 p. 118). In November 2004 visitors find themselves unexpectedly within the interactive happening of a language-play [Sprachspiel] on the Munich square "Salvatorplatz". The location is overlaid by a virtual light- and acoustic space. The installation transforms the newspaper into a passable walk-in data stream of daily news. Words stream virtually across the ground in front of the building as well as across the staircase steps, stone benches and tables. Headwords of the latest news stories are illustrated like a news ticker as a flow of

words. Artificial voices read out single words. Touch-screen and microphone enable visitors to modify the word flow and select individual terms. A semantic system immediately adds several similar ‘befriended’ words to this selection. The linguistic flux becomes visible to all through the streaming of words. Some visitors try to identify the meaning and correlation behind the words; others toss words at each other like in scenic dialogues. All participants become actors and all data-entries become data-performers. Interactively the news gets rearranged and visualized on the projection screen as a ‘Living Newspaper’.

Media art critic Christiane Paul describes the superimposition of the physical urban space with the linguistic data space as a fusion of two public areas:

“Literally inscribing the daily news as a linguistic and semantic space onto the streets of the city creates a fusion of public arenas that usually remain fairly separated in the physical sense: the public information space of daily events and the local, public space of the city traversed by a constant flow of people. While the inhabitants of a city naturally dwell in both of these spaces – the public domain of information and of the city – they usually do not have the possibility to experience these localities as connected networks or collaboratively reconfigure them. Energie-Passagen« literally reinscribes the passages of energy that inform our daily life onto the street, allowing the passers-by to »perform« the events of the day in their multiple semantic connections. In the overlaying of both spaces the installation opens up – sensually as well as cognitively – a new experience of collectively feeling a discursive mental space (Paul, 2004).



Figure 1. “Energie-Passagen” [Energy Passages] in front of the House of Literature in Munich
©Monika Fleischmann & Wolfgang Strauss, 2004

Artistic Concept, Influencers and Techniques

The project title “Energie-Passagen” [Energy passages] derives from the understanding of language as mental energy. It refers to Flusser’s concept of passage and Walter Benjamin’s “Passagen-Werk” [The Arcades Project]. Vilém Flusser defines the term passage as a journey in which single elements get ‘traversed’ as fragments of a broader context to merge individual impressions as parts of a whole into a tangible image (Findeisen 2004). Flusser’s notion of passage is to be understood against the background of nomadism, the contemporary mobile lifestyle of the ‘telematic society’. In contrast to ‘sedentary’ thinking in terms of fixed categories this corresponds to thinking in terms of relations. Walter Benjamin’s method of text montage in his “Passagen-Werk” inspired the project, too (Benjamin 1982). Adorno remarks that Benjamin tries “to do without any kind of evident interpretations and to get the meanings exclusively revealed through a way of shock provoking material montage” (Adorno 1970, p. 26).

Likewise, yet in a contemporary manner, the newspaper articles are fragmented by the code and are represented as a new montage through the intervention of the participating visitors. The people are confronted with continuous new constellations of terms and establish hereby personal associations. By using RSS feeds of the Süddeutsche Zeitung [South German Newspaper] daily information is processed through a linguistic tool and automatically entered into the software system day by day. Generated from 30.000 words of the daily edition, the newspaper is reduced to the 500 mostly mentioned catchwords. This fragmented newspaper edition is calculated as a semantic network and is projected as a flow of words on the ground, appearing as an audio-visual panorama in urban space. The architectural space is enriched and layered with artificial artifacts that move smoothly in the space. An unknown image of the city is revealed.



Figure 2. The Süddeutsche Zeitung [South German Newspaper] as a semantic information network and interface prototype of the news flow, from June 24th 2004 ©Monika Fleischmann & Wolfgang Strauss, 2004.

News Streams Running through Ourselves

The sonification of the data by means of artificial voices extends the visual perception on the auditory level. A text-to-speech method converts the words to a sound-panorama and supplements the movement of the image complementary. The spatially staged sound, the fluid motion and the gestures of selecting create an atmosphere of ceaseless change. The performing visitors orient themselves according to the echo of these medial elements and it results in a form of echolocation. While one word is still being uttered, it is already heard and while it is being heard, inner images evolve. The hearing and imagination mutually reinforce each other. The sound scientist Holger Schulze describes the simultaneity of image, sound and motion as “the orchestration of sensual and perceptual media and news streams” (Schulze 2005, p. 8) which has an impact on the human body. Schulze notes that “we could have the impression all the current newsstreams were running through ourselves” (Schulze, 2005, p. 7). The visitors participate in a performative reading. Words literally flow through the body and make the audience perceive the place sensitized. This is achieved by seamlessly integrating the virtual image and sound space into the urban environment. The amazing compatibility arises because audio-visual perception and digital narration - the superimposition of physical and virtual reality - create an imaginary space that one can physically feel - a true virtual reality. This has been confirmed by many visitors in numerous interviews. Therefore we understand mixed reality as the format of a seamless, sensomotorical and cognitive entanglement of the perception of virtuality and reality (Strauss & Fleischmann 1999, pp. 93-98).

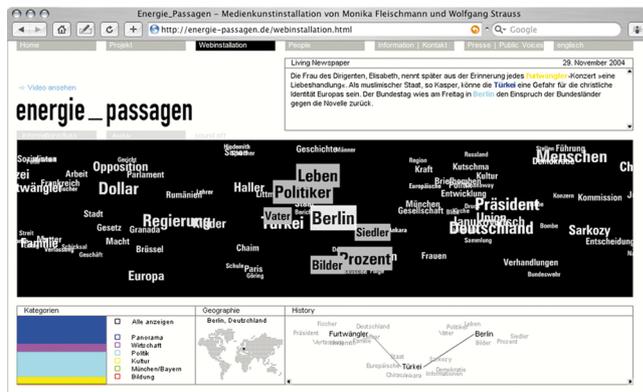


Figure 3. The interface model of the information flow in Web format.
<http://energiepassagen.de/webinstallation.html> © Monika Fleischmann & Wolfgang Strauss, 2004.

The Information Flow as an Object of Reflection

The daily news flow across the square literally as a stream of thoughts. It becomes a passable and tactile entity in urban space. We observe young girls just singing out loud: "energy, energy" and walk happily through the projected words, taking a bath of light. Other passers-by intervene in the production by selecting words of their own interest. The software

system answers with five additional keywords -'befriended' words - which semantically refer to the origin of the search term and are arranged in a ring around it. This word ring, highlighted in chromatic green, remains visible for some time in the foreground of the white word flow. At this moment an actor walks through the appearing words and associates them with his own thoughts. By this thought-performance a further level of virtual reality is created. The actors become co-authors of the work, which in turn stimulates new activities. It is an entanglement of perception and reflection.

Sociologist Sherry Turkle defines "Energy Passages" as an evocative medium that, through the way it is staged, generates increased attention for its own environment and thus becomes an object of reflection. Turkle characterizes the receptive perception of visitors through active participation in the process of deconstruction and reconstruction and sees in it an opportunity that enables visitors to get an idea of our culture of simulation: "The idea of a spatial experience of the discourse of news in urban space and the possibility of deconstructing the newspaper captures the fragmentation of how the citizen experiences media in a culture of simulation. It reflects and concretizes an important cultural and political moment and makes it an "object of reflection". (Turkle, 2004).

The metaphor of the flow of information symbolizes the phenomenon of information overload and continues the principle of Weizenbaum's "Eliza" by apparently being asked questions by a 'therapist'. The initial flood of information is transformed into an atmosphere of intensity. However, the question here is no longer whether machines can think, but whether man can think.



Fig. 4: Information flow, keyword and semantic linking. © Monika Fleischmann & Wolfgang Strauss, 2004.

What is really important to us as artists is not the precise search for information, but the dialogue itself and the associations of the visitors. The audience discusses questions such as: "Where do these words come from?" "What do these related words have to do with my chosen

term?" "How does the Ring of Words relate to my keyword?" "Are the words connected to the current news?" The visitors interpret the given text materials and work out an often critically changed, astonishing or astonishing meaning of the contents. Through the performative montage in the form of a dialogue, the participating audience stages a special form of narrative reading.

The Interface as a Rhetorical Figure

Energie-Passagen can be seen as a kind of rehearsal stage for interactivity. Microphones and touch screens, the interfaces to this performative platform allow access to the 'play material', the words. The flow of information as a virtual stage is a rhetorical figure and a stylistic device for public reading and writing. The player's mirror figure is based on the digital and rhetorical figure used. They offer an explorative play environment that is expanded through participation. The effect of the continuous flow of data on the participating audience is similar to children who sink into the play and forget their surroundings. Psychologist Mihaly Csikszentmihalyi calls this phenomenon 'flow' and recognizes in it the possibility for a person to enjoy life (Csikszentmihalyi 1975). It is an activity in which the participants are completely immersed in an activity that determines our virtual-real environment today. The artificial flow of words is reminiscent of a real stream. It accompanies the audience and encourages them to participate. Not only the players, but also the flow of information and the semantic network of related words are called data performers. (Fleischmann & Strauss 2011 b) Before the players enter the stage, they record a word and register as fellow players via microphone or touch screen. As soon as the players select a word, the flow of information is stopped. The interfaces - touch screen interface or micro - activate a dialog with the virtual data. Invisible connections between words become visible. The interaction inspires further actions and new narratives develop. The interface appeals to us and says: "It's quite simple! Just pick a word and it'll come right up." And it flows here together with further words. It's like saying the word and demonstrating, "Look who I brought." Thus the overwhelming number of 500 words is reduced to five to six words, which tell a story that we fill with our own associations.

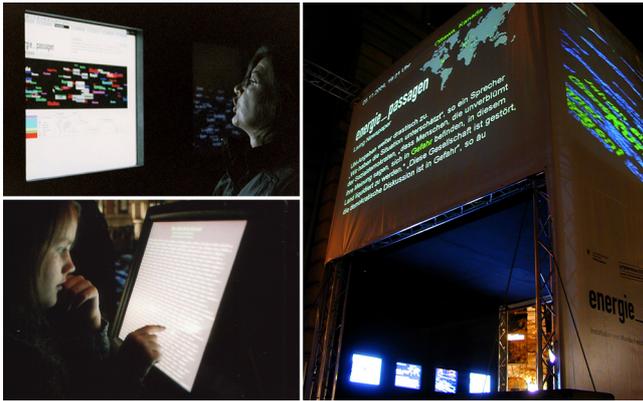


Fig. 5: Touch screen interfaces and the ‘Living Newspaper’ as a montage resulting from intervening participants. © Monika Fleischmann & Wolfgang Strauss, 2004.

Based on the words and their original phrases a new montage of the text comes into being that portrays the personal interests of the visitors. Embedded in urban space three elements built up the virtual space of dramatized time: 1.) the “Living Newspaper” together with 2.) the data flow and 3.) the panoramic audiosphere. Whereas while reading the eyes usually pursue the text, i.e. the letters within the line; now the eyes focus to read the moving and passing word. The words pass by, but the eyes try to keep up with them. Some visitors take advantage of the moment in time and the motion by physically going along with them while reflecting on the word and its meaning. The reading lasts here just as long as the reflecting on a word persists. The performative act is initiated from being an observer to becoming an actor, an intervening participant and finally a data performer.

Change of Roles and Narrative Reading Processes

The staging offers space for manifold social roles. The experience of being watched is part of the staging. Furthermore, a continuous change of roles takes place. The visitor becomes a spectator, then he becomes an actor and thereby an element of the performed staging. The audience encounters a wide range of roles regarding the dialogue between the people, the multi-user environment and the anonymous situation of the internet spectator. Instead of mediating a linear text the digital knowledge structure conveys a dialogue between the participants and the digital artefacts. Through performative reading the news are being read anew by the audience. Freed from context and syntax of the original texts the isolated words open up room for associations and speculations. Kaspar Spinner, an expert on language didactics, describes operative procedures like permutation or omitting as cognition fostering when reading and interpreting texts (Spinner 2001). The installation “Energie-Passagen” [Energy Passages] provides a reading and writing technique which creates a particular

imaginativeness. Therefore, it is not just simply about seeking and finding information, but rather about composing own thoughts in dialogue with the information.

The interactive staging initiates a reading movement from keyword to keyword. In the reading process along the individual words, the visitors find and reveal semantic connections, which they supplement and interpret with their own thoughts. They discover hidden relationships and dependencies. With this associative filling of gaps, the people create their very own approach. German scholar Wolfgang Iser presents reading as a process in which the meaning of texts is generated in the first place (Iser 1994, p.195). Reading the information flow has the following effects: 1.) Meaning is created as a product of interaction between text and reader. 2.) With regard to the collective reading process, a common experience of what has been read results from interaction and participation.

Media theorist Peter Matussek also points out that the “*Energie-Passagen*” [Energy Passages] resemble a staging in which text and reader are equally involved:

It is not about throwing around technoid text fragments like what the hypertext cult celebrated excessively, but filling the remaining gaps using in an odd way smoothly operating automatisms. This especially due to the strikingly harmonious, however, fragmentary recomposing of what we have latently retained as consumers of the news. In this way of staging life is emphatically breathed into scripture. It becomes vivid not just because of the bare motion of pictures itself, but because of its media practice to stage performative readings in which text and reader equally participate in a constructive way.

Additionally, the compensatory flare-up makes the motion of pictures continuously flirt with its own demise. In the contemporary silicon age the future of scripture rather lies within visual, sculptural and architectural forms of expression than in “secondary orality. This is exactly what the installation makes the visitors sensitively experience (Matussek 2004).

Neuropsychologists distinguish two different processes to identify the meaning of words which the brain holds and which are activated in divergent contexts. When reading a simple and ordinary text the act of reading appears easy and effortless. We do not have to think about the single words. But as soon as we have to pay attention on particular words or phrases, because of lacking letters or a bad and hardly readable handwriting, we are forced to reason about the meaning implied by the text and the reading process loses its automatisms. Therefore this hold-up of reading results into attentiveness (Dehaene 2009). A similar procedure is used for the interactive staging of “*Energie-Passagen*”. The reader slows down

his movement and starts to wonder about the word meaning and their semantic correlations. Due to using the words of the non-linear system of the interactive installation "Energie-Passagen", the interface represents a narrative unit that is transformed into a performative unit by the reader. Everything in this language play [Sprachspiel] (Wittgenstein 1967) depends on what is happening at the moment. That means to play with language, to draw meaning from it, to reconsider and relocate the involved words. Here, to move means giving meaning to words. Recombining the words brings out mental activity and unforeseeable knowledge.

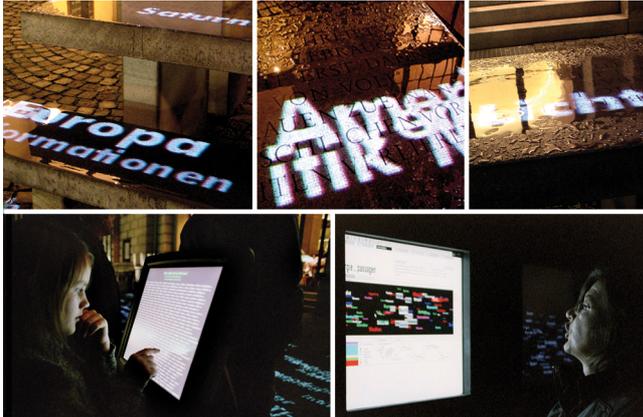


Fig. 6: Performative language plays and verbal exchange between participants © Monika Fleischmann & Wolfgang Strauss, 2004.

The Installation as Measuring Device

The starting point for the statistical measurement regarding the inter- /actions is the frequency of particular, chosen words. The visitors' intervening is digitally registered and recorded as 'local energy' (Fleischmann & Strauss 2004 b). The occurrences of the most frequently used newspaper words are statistically determined throughout the four week long exhibition in public space. The *Sueddeutsche Zeitung* [South German Newspaper] is one of the most important opinion-forming newspapers in Germany. The infographic shows the seldom frequency of education and culture, whereas the reporting on politics and economy dominates. Particularly frequently used words of the newspaper such as "percent", "years", "Germany", "millions" are of objective quality. However, the majority of the words selected by the participants are of emotional quality: "price", "parents", "victim", "love", "food", "girl". Thus the sober pragmatics of the newspaper faces the emotional subjectivity of the intervening people.

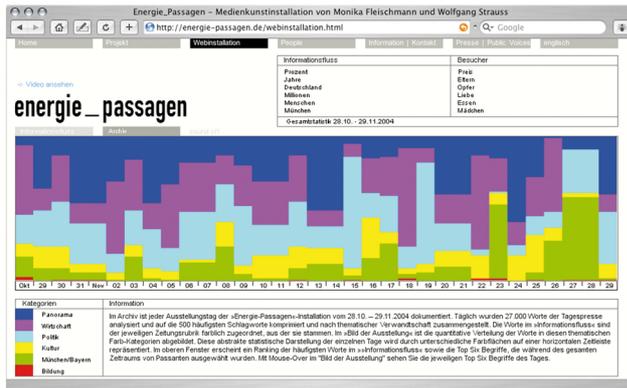


Fig. 7: Color coded interactive measurement protocol ©Monika Fleischmann & Wolfgang Strauss, 2004.

Regarding the visualization of the virtual dialogue between citizens, news and journalists, we are thinking of Kevin Lynch, an American urban planner and architect and his perceptual theoretical approach to mapping and visualizing the city. His most influential books include "The Image of the City" (Lynch 1960), a groundbreaking work on the form of perception of urban environments, and "What Time is This Place?" (Lynch 1972), which theorizes how the physical environment records and reconstructs temporal processes. Lynch examines the city as a physical form because it assumes connections between human perception and the architecture surrounding it. He poses the aesthetic question in a functional sense: what function does the image of the city, its visual impression have in the field of perception of its inhabitants? and he thus makes it accessible to the psychological apparatus of methods.

With the "Energie-Passagen" [Energypassages] we follow Lynch's example, but we stage the city as a rehearsal room in real time for the citizens on the basis of investigative monitoring tools. The installation unites the interests of people in public space and evokes critical observation. This interactive process offers the visitors not only the special perception of the place and a public dialogue, but also a local feedback on their environment, which increases further in the globally networked echo chamber. Elements of the physical and visual experience of visitors form a stream of embodied consciousness that reflects the dynamic flow of perception and represents an interaction between body and psyche. The viewer becomes an active and embodied viewer on an open stage in public space.

Conclusion

While urban architecture deals with processes of form finding and design, our installation in public space reveals the energy of the city and the unpredictable knowledge of

the citizens through its interactive dramaturgy and processes of discovery. The visitors take on many roles and are in one and the same person: viewer, actor, co-author and translator. While some watch, others act and stage performative acts for the audience. These participants perceive themselves in the aesthetic reception as data performers who perform a scenic work in connection with virtual data partners. The different forms of interaction allow visitors to test their social role as actors in a way that is not given in real everyday communication. The audience experiences the change in meaning of public perception through visual and acoustic processes of decontextualization. The experienced knowledge is emphasized and the participants perceive a space of thought that they shape themselves. In contrast to conventional VR installations, where an operator lets the visitor put on a heavy and hardwired Head Mounted Display with the words "here there is unbelievable to see", and unlike in the theatre, where there is a natural border between spectator and actor, on the mixed reality stage an immediate entry and participation is possible even for initially uninvolved persons.

Today, interactivity is omnipresent and thus no longer the core of media art. Paradoxically, the media artists of the 1990s did pioneering work and their results were eagerly taken up by the engineers of the industry. Interactivity in its simplistic industrial form has permeated society. The interface has become intelligent and, as a lifestyle product, is becoming a cultural object of consumer culture. This interface is smooth and subtle. Its real purpose of data trading remains invisible the more the visible part is polished. The promise is even, that machines come to know us so well, that they will do everything for us. Now we are confronted with the interactivity of the system itself - Artificial Intelligence, which focuses on monitoring our activities automatically. All our communication data is stored and that data represents the real world, all be it presenting a contradiction that this new world is invisible, because it is not accessible. It is a hidden reality based on secret observation and persecution. Data became objects of desire with which reality can be influenced and turned into money. It is the theft of our brains and brainwashing by monopolies.

In contrast, media art has understood the interface as the cultural technique of a producer culture for digital transformation. The interface was understood as a threshold of transition to the digital, resistant and thought-provoking. With our interface paradigms we were about 10-15 years ahead of the industry, for example with our patented PointScreen (2002), an interface for contactless gesture control to promote sensory-motor perception (Dartel 2008). Now Apple is working on a touchless gesture control for future iPhones to be launched in 2020. If NSA also establishes a startup for civilian applications, our last prediction of semantic knowledge exploration by travelling in the data space would come

true. It's a pity the industry doesn't pay back for inspiration. Most artists-inventors are on the unpaid side of the competition.

In the meantime, the buzzword digitization usually means a technical upgrade of hardware and is seldom understood as a spiritual matter. Today, sophistication prevails over spirit. One could think that with the reduction of the devices also a reduction of the mind takes place. The computer is no longer the universal machine, but the shrunken smartphone appears as a small helper in everyday life. It reminds of "Mother's little helper" (Rolling Stones 1966). The allusion refers not only to the "mother" but also to the spirit of the 1960s. It was a reference to the drug Valium, which was developed in the 1960s and has since been successfully marketed despite its considerable dependency potential. Today's dependency potential comes as innovation from markets supported by technocrats without democratic legitimacy and with the hope of rapid profit (Enzensberger 2011).

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