Mirko Tobias Schäfer

Bastard Culture!

User participation and the extension of cultural industries

Printed by All Print Utrecht, The Netherlands

ISBN 978-90-393-4973-1

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User participation and the extension of cultural industries

User-Partizipation und die Ausweitung der Kulturindustrien
(mit einer Zusammenfassung in deutscher Sprache)

User-participatie en de uitbreiding van de culturele industrie.
(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de Universiteit Utrecht op gezag van de rector magnificus, prof. dr. J.C. Stoof, ingevolge het besluit van het college voor promoties in het openbaar te verdedigen op maandag 1 december 2008 des middags te 12.45 uur

door

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Preface and Acknowledgments

While being a freshman at Vienna University in 1996, where I had enrolled in theater and communication studies, I had to take up a job to pay my rent. After a while of doing construction work for a shady landlord, I was hired by a small advertising company that had just pulled in a contract from an uprising IT company. When meeting my future boss in the lobby of Vienna's World Trade Center at Vienna Airport, I had no idea that this job would profoundly change my life. Our task was nothing less than introducing Cisco Systems—the market leader in networking technologies—to the Austrian market, and explaining pretty much to every businessman and woman between Vienna and Salzburg what this thing called Internet was about. Back then we usually heard people ask, where this Internet was located, who was in charge of it, which company was running it, and how long we would estimate the Internet would be around. The folks at Cisco were professional enthusiasts, completely dedicated to bringing the Internet to each and every person on the planet. The planet? One day I saw a poster hanging in a Cisco office, displaying a stereotypical photo of a flying saucer. The caption on the poster said: If they have a router on board, we can talk to them! It was all about those routers, the network technology routing information packets from source to destination, from sender to receiver, and enabling to browse the Web, send e-mails, download music files or play games online.

While moving along with the rising new economy, and literally moving from a make-shift office in an aircraft hangar to a posh outfit at the 24th floor of the new built Millennium Tower, I got sucked more and more deeply into the Internet, running up extremely high telephone bills when surfing the web from my student flat, and therefore spending more and more time at the company where I could use all the facilities for free. I had the feeling of witnessing history in the making, and I truly felt part of a revolutionary wave transforming society,

communications and social relations on a global scale. However, in contrast to my employers, I thought there is more to the Internet than transforming each corner store into a web portal. And I could not swallow the hype without any second thoughts; I could never completely abandon my doubts when the IT crowd was partying hard and burning through their money.

Unfortunately there were only few scholars in Austria who wanted to consider the Internet as a field of research or an object for developing cultural theories further. Luckily in 1999 I got the chance to join the recently established program for new media studies at Utrecht University, where my personal experience of digital culture was confronted with analysis and further theorizing. I was also lucky to meet a bunch of geeks, nerds and fellow enthusiasts, in both countries, the Netherlands and Austria. We decided that our experience and knowledge needed a platform and together we founded [d]vision, the Vienna Festival for Digital Culture, a rogue undertaking, financed by shamelessly exploiting the resources of our new economy employers, and borrowing resources from unflinching or somehow pursued friendlies. And, of course, creative accounting, and slick Power Point presentations, as well as some influential connections were helpful, too. Three years in a row we ran an almost no-budget festival on all subjects that mattered to us most in digital culture and we invited many of the interesting and inspiring people we ever wanted to talk to. We screened amazing films, hosted heated debates and unforgettable parties, while the new economy was crumbling apart in crashing stock markets. When the day jobs in insolvent companies became too unpleasant, even I noticed it was time to graduate and get a job.

I could not have been more lucky in returning to Utrecht University, where I found the most friendly and stimulating environment I could imagine, along with the finest colleagues. The enormous freedom I enjoyed as half-time researcher and half-time teacher at the Department for Culture and Media Studies, and the

generous support from my fellow and senior colleagues has shaped my theoretical framing and analysis of digital culture substantially. It guided my many unorganized thoughts into direction of a more solid argument. Looking back on the past years, I admit I felt like a node in a dynamic network, always connected, and always embedded in a perpetual flow of communication and interaction; it gave me the comforting trust that I am not alone behind my computer screen.

I am indebted to many people who in one way or another contributed to realizing this work. I must pay tribute to the people at the Department for Media Studies (MCW), and at the Research Institute for Culture and History (OGC) at Utrecht University for providing me not only with a great job, but with an open-minded, friendly, and intellectually stimulating environment, and for being always extremely helpful and supportive. The people at the New Media & Digital Culture (NMDC), Marinka Copier, Isabella van Elferen, Cris van der Hoek, Chiel Kattenbelt, Erna Kotkamp, Sybille Lammes, Ann-Sophie Lehmann, Eggo Müller, Eva Nieuwdorp, Thomas Poell, Indira Reynaert, and Martina Roepke have been great colleagues. At countless occasions I benefited from their knowledge and wisdom, and they have been a great help in making me feel at home in the Netherlands and getting along better with the Dutch culture and attitude.

I thank my supervisors Frank Kessler and Joost Raessens for their efforts in guiding me through this venture, and for giving me the freedom I needed to work this thing out. I am also very grateful for the helpful comments and remarks I have received numerous times from William Uricchio. I am glad for having found true friends and amazing colleagues in my fellow PhD colleagues Marianne van den Boomen and Imar de Vries. It has been a great pleasure and an honor to embark on this journey together. Kim de Vries has been an amazing help in discussing earlier versions of this text and improving my English, as well as being a great friend and infallible

support when things get difficult. I am very grateful for having had the chance to discuss the topic of my research and to receive valuable comments from my dear friend Tanja Sihvonen as well as sharing the exciting experience of finishing our dissertations simultaneously.

I am also indebted to my research students Lisette van Blokland, Jaap Kok, Vlad Micu, Pascal Rancuret, and Javier Sancho Rodriguez for numerous interviews with members from the homebrew and console gaming scene, as well as for their hands-on investigation of homebrew software and modded game consoles. Mark Speer pulled several all-nighters to edit my text and to improve it considerably.

Many people have been important, at one stage or the other, in helping to finish this piece of work, either by correcting my English, giving feedback and commenting on concepts and/or unfinished chapters and half-cooked ideas: Aibopet, Florian Cramer, Andreas Fickers, Andreas Leo Findeisen, Frank Hartmann, Franz Lehner, Koen Leurs, Dennis Jaromil Rojo, Douglas Rushkoff, Peter Steinberger.

Friends have been there in moments when things were not chugging along as smoothly as they should have, and I am indebted to their generous and kind ways to cheer me up: Jesse Darlin', Ralf Futselaar, Pepita Hesselberth, Jim Hurley, Nancy Mauro-Flude aka sister0, Eva Stegeman, Nanna Verhoeff, and Florian Waldvogel. I also want to thank my dear friend and close colleague Bernhard Rieder for his indefatigable feedback and comments, as well as for the already long-lasting friendship and always inspiring collaboration. This list would be incomplete without Patrick Kranzlmüller, whom I know since my first year at Vienna University, and who has ever been a dear friend, and a reliable comrade.

A special word of recognition goes to Gudrun Frey, my former history teacher; her letters and us meeting for coffee and cake have been a treat and a very welcomed distraction since I graduated from high school and throughout my students years, and will hopefully continue for many years to come. I also want to thank the Panozzo family for comforting me in the bosom of their family for many years.

Finally, I want to offer my eternal gratitude to my family. I cannot sufficiently enough thank my parents, Vera and Dierk Schaefer for their unquestioned love and support. Without their patience and enduring understanding, the most stubborn child would never ever even had graduated from high school. I want to thank my sister Randi Christiane, and my brothers Martin Malte and Micha Johannes for coping with my odd ways, and showing understanding for whatever I do.

Introduction

> The desktop revolution has brought the tools that only professionals have had into the hands of the public. God knows what will happen now. (Marvin Minsky, Time Magazine 1983)

Yet another media revolution?

In 1983 *Time* magazine nominated the PC as the "Machine of the Year". The edition's title "The Computer moves in" announced the Information Age entering our den. On the cover a man sits alienated in front of his new roommate. What he plans to do with the computer or what the machine might do to him is not quite clear. In January 2007 a computer was again displayed on the *Time* cover, but this time the computer screen is a mirror reflecting the "Person of the Year": "Yes, You. You control the Information Age. Welcome to your world". The cover is a symbol of the emancipation of the computer user from the alienated user of 1983 to the "hero of the Information Age" in 2007.

The attention devoted to the computer in 1983 marks an important milestone in the emergence of the so called information society. What started as a secret technology for military research—an accounting machine in scientific laboratories and corporate companies, advanced technology initially unthinkable as a mass-produced consumer good—suddenly entered the lives and homes of common users as the microcomputer. With the microcomputer users had a high-tech device at their disposal, a machine which was able to execute every task provided in a symbolic language the machine can understand. Over the past two decades, the computer has developed into an everyday medium. Due to easy-to-use interfaces and the Internet which has increased the reach and use of computers globally, computer use has become common everyday practice.

The 24-year interval between the two editions of *Time* magazine bridges the gap between the introduction of the computer into the consumer sphere and the emergence of a new global cultural practice. Several trends during this time span ultimately shaped the contemporary cultural practice of computer use:

a) The computer developed into a medium for work, leisure and entertainment

b) The Internet became the primary means to connect computers, and thereby constituting a world-wide information infrastructure

c) The emergence of the World Wide Web (WWW), which with its graphical user interfaces and hypertext structures made networked computers a useful tool for common users and consequently became a mass medium by 1995.

d) Most recently, in concert with the above, broad-band Internet connections and related services enabled users to publish, organize and share large quantities of data online.

The result we are witnessing today, emphasized in the above-mentioned edition of Time magazine, is referred to as *Participatory Culture*, which describes the new role users have assumed in the context of cultural production.[1] The new media practice didn't immediately manifest itself on such a large scale. Despite the attention the microcomputer received in the 1980s, it remained a tool used primarily in offices or as a gadget for enthusiastic early adopters often referred to as *nerds*, who developed an understanding of the computer and its applications that very much shaped the way personal computers are perceived today.[2]

[1] The term participatory culture was initially introduced by Henry Jenkins (1991, 2006a, 2006b, Jenkins et al. 2006) to distinguish active user participation in online cultural production from an understanding of consumer culture, where audiences consume corporate media texts without actively shaping, altering and distributing them. For a discussion of concepts of participation in culture studies, see Chapter 2.

[2] Nerd is often a synonym with negative connotations for persons with limited social skills dedicated to a special interest, often computers or science. See the Jargon File, a glossary of hacker slang, version. 4.4.7: Nerd, <http://www.catb.org/jargon/html/N/nerd.html>.
The word geek, or computer geek describes the same phenomenon, but has a more positive connotation. Both terms are used appreciatively among individuals that are labeled by others as nerds or geeks and actually have over-average skills. The terms geek and nerd can be found in

The machine initially developed for solving complex and repetitive arithmetic problems thus developed into a common office device, and subsequently into an everyday medium for consumers who can do practically anything with it, what can be informational formulated, from filing tax returns to organizing holiday pictures. The Internet and its successful application, the World Wide Web (WWW), have been crucial in this development.[3] The WWW has enabled large media audiences to recognize the computer as a handy tool for communication, entertainment and leisure activities. Software like *web browsers*, which embed networking in a graphical user interface, attractive services such as web-based e-mail, chat programs, online communities, and Internet forums have increased the computer's appeal to a large group of consumers. The Internet diffused aspects of the computer so that not only machines but also people became globally connected. The networked computer has become a commonly used medium in the Western industrialized countries.[4]

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many aspects of computer culture, and actually one could state that much of contemporary computer culture is derived from geeks and nerds.
See the Jargon File, version 4.4.7:Geek, <http://www.catb.org/jargon/html/G/geek.html>.
Popular culture refers often to geeks and nerds who are usually bullied by athletes (jocks), who have girl friends but will eventually lose them to the smarter geeks. See, for instance the movie The Revenge of the Nerds (Jeff Kanew, USA 1984), or the music video White and Nerdy by Weird Al Yankovich (Volcano 2006). However the term derives from the 'circus geek', a character who bit the heads off chickens, and also featured as such in popular culture, as for instance in the film noir Nightmare Ally (Edmund Goulding, USA 1947).

[3] The World Wide Web (WWW) is actually only one of many applications that are executed on the Internet. The Hyper text Transfer Protocol (HTTP) facilitating the WWW to function works on the application layer of the Internet protocol suite, see RFC 1122). The term Internet is most often used synonymously for the WWW, which in fact is interfacing many different applications that are all different Internet protocols, such as e-mail, FTP, P2P programs, etc. Ed Krol's legendary *The Whole Internet User's Guide and Catalog*, provides a good overview and explanation of the Internet (1992). It differentiates between the many networks and applications represented by the Internet, the WWW being only one and the most recent among them. In the context of this publication the term Internet is used to refer to Internet technologies in general. When necessary to differentiate the individual network, protocol or application will be named explicitly.

[4] The Internet World Stats counted 1.412 billion Internet users in March 2008, <http://www.Internetworldstats.com/stats.htm>.
The PEW Institute identifies over 70% of US Americans as regular Internet users, and within the European Union overall access to the Internet is an estimated 55.7% of the population. Topping the list are Scandinavian countries, such as Sweden, with over 77% while new EU members, such as Bulgaria, rank at 30% and Romania at 31.4% respectively, see Madden, Mary, Report Internet Penetration and Impact, PEW Internet & American Life Project, April 26 2006,

Participation has become a key concept to frame the emerging media practice. It considers the transformation of former audiences into active participants and agents of cultural production on the Internet. Popular media acclaimed the new possibilities for consumers to actively create and produce media content. Users became explicitly active participants in the cultural production thanks to the latest WWW developments. The buzz-word *Web 2.0* described a set of web technologies that facilitated easy publishing and content sharing, as well as the establishment of social networks.[5] Web 2.0 applications have been attracting a multitude of users, pushing the trend towards socialization and the creation of so-called *User-Generated Content* (UGC).[6] Over 50% of American teenagers use *Social Networking Sites* (SNSs), such as *Facebook* or *MySpace.*[7] Every third American Internet user categorizes or organizes online content by adding *meta-data.*[8] Those figures seem to confirm the perception of the increased capacity of

<http://www.pewInternet.org/PPF/r/182/report_display.asp>
Internet Usage in the European Union, 11 November 2007,
<www.Internetworldstats.com/stats9.htm#eu>.

5 The term Web 2.0 was coined by publisher Tom O'Reilly to describe Internet technologies summarized as *Asynchronous Java and XML* (AJAX) and the new services evolving around the use of it (O'Reilly 2005).

6 The terms *User Generated Content* or *User Created Content* (UCC) directly refer to the phenomenon of users producing media texts and describes foremost texts (either written text, photos, videos or audio files) stored on websites. The Organisation for Economic Co-operation and Development (OECD) defines User Created Content as "i) content made publicly available over the Internet, ii) which reflects a 'certain amount of creative effort', and iii) which is 'created outside of professional routines and practices'" (OECD paper, 2007), see: OECD, Directorate Science, Technology and Industry, Committee for Information, Computer and Communications Policy: Working Party on the Information Economy. Participative Web, User Created Content, <http://www.oecd.org/dataoecd/57/14/38393115.pdf>.

7 Lenhardt, Amanda and Mary Madden. 2007. Social Networking Websites and Teens. An Overview, January 7 2007, PEW Internet & American Life Project, online: <http://www.pewInternet.org/PPF/r/198/report_display.asp>.
On Social Networking Sites (SNS) users can post personal profiles and connect to their peers as well as establish new social relations; the most popular student SNS is Facebook <www.facebook.com>, followed by the more heterogeneous SNS MySpace <www.myspace.com>, which initially was developed for artists to promote their work. The Google subsidiary *Orkut* <www.orkut.com> is primarily used in South America. Business people connect on *LinkedIn* <www.linkedin.com>. These are only a few of the many different social networking sites.

8 Rainie, Lee. 2007. Tagging, PEW Internet & American Life Project, <http://www.pewInternet.org/PPF/r/201/report_display.asp>.

users to participate in cultural production. However, the enthusiasm about the user activities is, as I will argue, somewhat premature and rather unbalanced, because it often neglects the fact that underlying power structures are not necessarily reconfigured. Although the new media practice challenges some established business models, it does not necessarily make the industries exploiting those models disappear. In the cultural industries, traditional companies can not only adapt and attempt to change business models accordingly or develop new ways of earning revenues, but it is also visible that new enterprises emerge and gain control over cultural production and intellectual property very much similar to the monopolistic media corporations of the 20th century. The culture industry is therefore anything else but overturned by an alleged revolution of users.[9] This research will describe the consequences of user participation rather as an *extended culture industry*.[10]

However, users were granted new possibilities for cultural production that were previously inaccessible to consumers of industrially produced goods and mass media: media content could be produced by amateurs, published and distributed on a global scale at negligible cost. Internet users could maintain weblogs, publish photos, edit videos, engage in online communities, exchange

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Meta-data or meta-information describe data about data. meta-information specifies content or the semantic relation to any stored file. An example for meta-information would be an index card in a library referring to a certain book. Online, *tags* are used for meta-information. Tags are keywords users can add to many things stored online. These keywords help structure information and improve information retrieval.

[9] The term culture industry, coined by Theodor W. Adorno and Max Horkheimer to describe an industrial complex which manipulates consumers through media productions is used in this research to emphasize the continuing presence of disproportionate power relations in media production. However, Adorno's and Horkheimer's suspicion of an intentional manipulation of the masses by mass deception cannot be shared, and neither their expectation that a Marxist agenda to reconfigure media industries would solve the problem. For a discussion of Adorno and Horkheimer see Chapter 2.

[10] For a discussion of the extended culture industry and the unfolding socio-political dynamics see Chapter 5.

music files on a global scale and cooperate in the editing of encyclopedic knowledge and the programming of software. The Internet has therefore also become a platform for discussion and political debate.[11] The online encyclopedia *Wikipedia* or the open-source operating system *GNU/Linux*, can be seen as a collective production of knowledge and artifacts. Fan culture communities collect, store and distribute media texts produced by the traditional culture industry and add their own productions and comments to these shared archives.[12] Beyond the production channels of conventional industries, users create their own media texts, e.g. fictional texts, movies, radio programs, music, software etc., and distribute them on the Internet. The *netlabel scene* or the *computer demoscene* can be seen as exemplary of cultural production taking place outside of the confines of the media industry while not necessarily being related to its products at all.[13]

Users appropriate products on the fringes of the culture industry.[14] Software is

[11] Weblogs in particular serve as a medium to comment on political affairs, media coverage, and a variety of socio-political issues. For an enthusiast's account of so-called 'grassroots' media see Dan Gilmore (2006), and for a critical analysis Geert Lovink (2008).

[12] Fan cultures and the transformation of their activities in the digital age have been extensively analyzed by Henry Jenkins (e.g. 1991, 2002, 2004, 2006b).

[13] A *netlabel* is similar to a conventional record label, but music distribution takes place on the Internet. It mostly involves electronic music produced by musicians who often are not affiliated with the music industry and who generally distribute their music for free. An overview of the extensive catalog of music is available at the Netlabel Catalog: <http://www.netlabels.org>.
A *demo* is an audio-visual file, comparable to an animated video. It is compiled in real time and mostly written in assembler code. The name demo goes back to the roots of the demoscene in the software cracker world of the early 1980s, and refers to the tradition of adding animated graphics to cracked software to show off programming skills and send shout-outs to fellow scene members. The demoscene holds large events with hundreds of delegates attending programming competitions. However this scene is neither part of any significant commercial infrastructure nor is it the focus of academic research. In 2007 there were only a few publications on computer demos (e.g. Tasajärvi 2004; Vigh, and Polgár 2006; Polgar 2008). The most extensive published on that topic is by Antti Silvast and Marku Reunanen and is available on their website: <http://www.kameli.net/demoresearch/bibliography.php>.

[14] User appropriation describes how consumers use, change and adapt products. This process often involves uses unintended by the original vendors, and can also include modifications of the technical design. Appropriation has been perceived as a second stage of design, or "completing design in use" (Carrol 2004). Different levels of appropriation have been recognized according to the degree of modification and use (Akrich 1998) and has been considered a crucial aspect in innovation and improvement of design (e.g. Hippel 1988, 2005; Ciborra 2002)

modifiable as any product, i.e. it can be changed, extended, and used in different contexts. But software can be modified, and then globally spread at very low costs. User communities meet online and engage in collectively in software development projects. This has an effect on all software-based products since users can suit them to their needs. A Microsoft *Xbox* becomes a Linux computer.[15] Nintendo's *Gameboy* gets turned into a music instrument,[16] and Sony's robot dog *AIBO* learns how to dance.[17] Users change software-based consumer goods by altering their original design, as the example cases in Chapter 4 demonstrate. Software design and user appropriation reveal processes of interaction between the many participants in contemporary media practice: The often accidental collaboration or the many conflicts caused by user activities lead to the collisions of old business models with new practices. The different material aspects of consumer goods and means of production raise debates on regulation and legalization of emerging computer applications and user activities, which eventually shape society's perception of technology.[18]

Scholarly and popular discourses framed this phenomenon as an effect that information and communication technology (ICT) had in everyday life, shaping the common perception of consumers who have finally been emancipated and promoted to producers, culminating in their becoming "heroes of the Informa-

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[15] Xbox-Linux Project, <www.xbox-linux.org>.

[16] There are a number of musicians using *Little Sound DJ*, *Nanoloop*, and *Pocketnoise* software to produce music on the Gameboy; see *Gameboy Music Club Vienna* <http://www.gameboymusicclub.org/>.

[17] The hacker *Aibopet* offers a large number of programs on his website <www.aibohack.com>. The program *DiskoAibo*, which makes Aibo dance, is available there as well.

[18] Specific features of computer technology, software and the Internet play their part in co-shaping media practice. The characteristics of technologies are inextricably related to the way we perceive our lifeworld (Heidegger 1962, Ellul 1964), the ways civilizations unfold (Mumford 1966), and to the everyday use of artifacts and the shaping of cultural perception (Innis 1972; McLuhan 1962; Bolter 1986, Kittler 1995). An analysis of these characteristics is indispensable for understanding contemporary media practice and vital for framing a meaningful critique.

tion Age." This is promising news but covers only a part of the complex and dynamic relations between material aspects of technologies, users, content creators, ownership structures and legal issues. Enthusiasm about user participation must not neglect critical questions concerning the scope of its influence and the possibilities of the culture industry to implement user activities in new business models, nor attempts to employ legal means for confining and directing user activities. Participatory culture thus appears to be a complex construction consisting of various aspects that need to be addressed. The research at hand is therefore driven by this central question: **What constitutes the emerging digital participatory culture, and what are its implications for the organization of cultural production?**

This research perceives participatory culture not merely as users participating by appropriating commercial media texts or publishing their own productions. It analyzes participatory culture as a complex dispositif consisting of discourses, technologies and people. Participatory culture is therefore not limited to the new role of the users, but covers rather the unfolding dynamic connections between the various participants in cultural production. Consequently the romanticized narrative of consumers being promoted to producers and controlling the information age will be abandoned, because it appears rather as a great legend constituted by a popular discourse than by actual events.

In this book I will briefly map the discourses shaping the public understanding of participation and shows to what extent it affects the perception and development of technology. Analyzing the role of technology shows to what extent discursive elements are inscribed into technical design and how it can either avert or stimulate certain media practices. These practices are then analyzed in case examples, in order to provide an understanding to what extent user participate actually in design development, and to what extent companies, users, and technology are interconnected. In consequence to the new media practices

different dynamics are unfolding that are either aimed at confronting user activities and prevent them form challenging established business models, attempt to implement them into new revenue models, or to integrate the new practices in socio-political responsible ways to technological design and its various uses.

Don't believe the hype!

Participation is first of all part of a rhetoric that advocates social progress through technological development, and which aims to create expectations and understandings for technology. It can be seen as an appendix in the struggle against exclusion from political decision-making processes, as well as exclusion from ownership of the means of production, and the creation of media content.[19] The promise of social progress and a reconfiguration of power through participation is embedded in technological development and postulated anew with each 'media revolution' (Daniels 2002; Flichy 2007; Turner 2006). Many user activities seem to confirm the expectation raised by references to participation in popular discourse, and many design decisions are directly affected by the claim for and promise of broad access to information and information technologies. It constructed a moral framing of participation which developed blind spots with regard to analyzing different levels of use and design. There is an intellectual short cut which perceives increased user activity far too readily as a fundamental shift in power structures within the cultural

[19] Participation has been perceived as a key concept to democratization and the balancing of inequalities in society, dating back to the civil revolutions and rebellions of the 18th century and the structural transformation of the public sphere (Habermas 1962/1990). After claiming political participation primarily for those who already had economical power—the bourgeois citizens—participation was formulated in the more contentious terms of class struggle, calling for access to means of production. The rising mass production of consumer goods and the increasing prominence of mass media witnessed participation claiming access to media production and its means of distribution. Socio-political critiques aimed at the media and its ownership structures, criticized its inherent ideology. The legacy of the civil claim to participation is very much embedded in current media practice and the understanding of participatory culture.

industries. In consequence, many accounts of user participation are romanticizing their activities and overestimating their capacity of action. This research, on the contrary, aims at stepping outside the morally biased perception of participation. Defining participatory culture merely within a morally determined framework, and associating participation only with positive connotations, is highly problematic. Such a perspective neglects its roots within a long tradition of claiming participation and expecting social progress through technological development, and becomes uncritical of its own meta discourse. It also develops a blind spot for another shift taking place within cultural production: the transformation of media corporations from content producers to platform providers for user created content. One may ask to what extent the many user activities that were first described as a process of emancipation have been integrated into new business models and subject to corporate control. In addition, participatory culture cannot be reduced to user activity alone. Machine processes and software routines contribute to production as well, and actively engage with users. The hybrid quality features of information systems assign participatory agency to software design and generate many of the unfolding activities as result of collective interactions between machines and users. Consequently another often-marginalized aspect is the role of technology itself. The specific qualities of the technology stimulate or avert certain uses and thus influence the way technologies are used and implemented by consumers in society. These features affect both the design and user appropriation. Technology cannot be treated as a neutral black box. When examining technology it becomes evident that the engineering culture as well as a specific socio-political mindset is inherent in the design of technologies. Socio-political debates, regulations and the promise of participation can be translated into design decisions.

What has been dubbed *participation* is actually a complex discourse consisting of the following:

1) a rhetoric that advocates social progress through technological advancement
2) a cultural critique demanding the reconfiguration of power relations
3) the specifications of the technology
4) how they are employed for design and user appropriation
5) the resulting socio-political dynamics

The present research examines the constitutional aspects of contemporary media practice as they unfold and provides an analysis of *participatory culture*. In tracing the many aspects involved in the construction of current media practice, this research will identify and analyze the constituents of a participatory culture, thus providing a comprehensive understanding of the complex relations involved in the development of online cultural production. This research will also analyze the constituents of contemporary media practice, framed as a participatory culture, by exploring the relationship between material aspects of technology and the social use, the unfolding debates and the dissent that exists with respect to the use and implementation of new media practices. In order to address the question for the various constituents of a participatory culture as a whole, the following sub-questions will be treated in five individual chapters:

1) How is participation employed for the promotion of technological development?
2) How does claiming participation affect a scholarly approach to media practices?
3) How does the promise of participation affect design, and to what extent does it stimulate or avert material aspects of design and the use of technology?

4) How do users appropriate software-based products and develop media practices?

5) How are power relations in culture industries affected by specific features of technology, design, and user appropriation, and what strategies are used in response?

Concluding, the question is raised, how can contemporary media practice be integrated into socio-political regulation and whether it will be possible to connect it to a participatory democracy?

The present research focuses on specific qualities of technology, designers, users and social perceptions of technology and its use. Rather than adhering strictly to one established approach, the theoretical framework used in this research consists of aspects from different approaches.

Analyzing participatory culture

The enthusiasm about user participation resembles a veil behind which the actual constituents of participatory activities in cultural production are hidden. In order to untangle the many relations and transformations generated by software its design and use, it is helpful to employ theoretical approaches that take the complexity of discourses into consideration as well as the agency of artifacts. Participatory culture is not achieved simply by employing new technologies and should not be reduced to its symptoms, i.e. users taking part in the processes of production and distribution. Rather, the phenomenon unfolds on different levels: the promise of participation that constitutes a technological imaginary employed for promoting computer technology and the Internet. Claiming participation is an inherent element of scholarly commentary and reflection, which is somewhat hasty in accepting that emerging media practices are fulfilling the promise. But the discourse also unfolds on the level of technology's basic features. Therefore technology cannot be perceived as being either neutral or determining with regard to use and effect. Technology also has to be acknowledged as being discursive, or at least as something which represents the ongoing discourse on participation. This research recognizes three kinds of formations of artifacts and humans. The *dispositif of participation* sketches a macro-level of formations between discourses, users and technologies. *Actor-networks* constitute specific constellations within the dispositif of participation. *Socio-technical ecosystems* describe the interaction of large groups of users and information systems. These three formations will be briefly described in the following section.

The first formation is the dispositif, representing rather a macro-level. Looking at participation in terms of the media dispositif that underlies it, means that the various aspects, both discursive and non-discursive, human or non-human would be related to each other by power structures, knowledge about

technology and its design and appropriation, the discursive representation of socio-political issues and the transformations taking place through the interaction and relation of all participants. According to Foucault, a dispositif consists of

"discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions—in short, the said as much as the unsaid" (Foucault 1980:194-195).[20]

There is, however, also another strand of theoretical work in the field of cinema studies which uses the concept of dispositif in order to describe the actual setting in which moving images are screened (e.g. Baudry 1978, Metz 1977, Heath 1981).

In spite of the differences, one can say that a dispositif describes formations of various participants. Foucault employed it in order to analyze medical, legal, socio-political discourses, for example, as well as the formation of power relations in and through such discourse. The concept has been further developed into a dynamic set of interacting connections (Deleuze 1992) and more broadly defined as a concept of /in-between/ formulated by Peeters and Charlier (Peeters, Charlier 1999, cit. in Kessler 2006:4).

The use of theoretical tools such as the concept of the dispositif as it has been coined in media studies helps to avoid merely focusing on hermeneutic readings of media content and also takes economical, institutional, and social contexts into consideration. In the context of this study, the notion of the dispositif is also open to elements such as participation, playfulness, and even sensual experiences in the analysis of any given media dispositif. It offers the possibility of understanding the "in-between" as the capacity of action, the transformations,

[20] Foucault's dispositif has been translated into English as apparatus. However, with reference to Kessler (2006) the French term dispositif will be used.

and transactions between the various aspects of "the said and the unsaid." Looking at participation in its various forms in the domain of digital media in light of the dispositif means to describe a variety of formations of different relations between three domains, namely the domain of discourses (popular, scholarly, bureaucratic, legal...), technology (basic features and design) and people and social use (what users actually do with the new technologies).

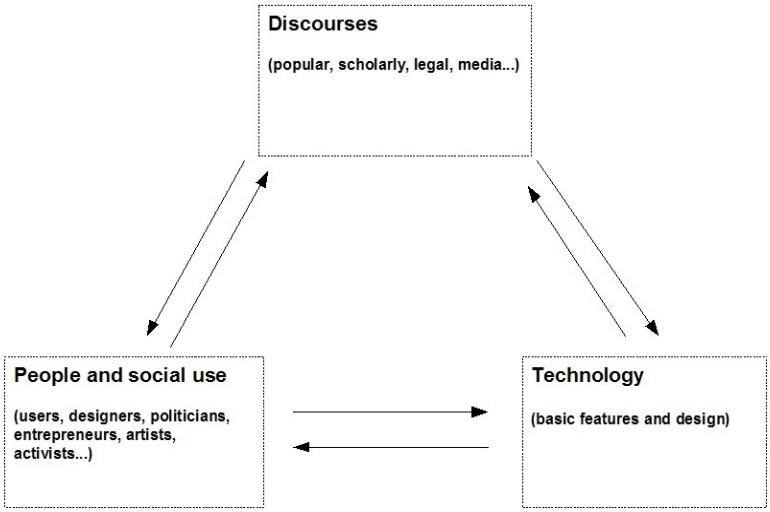

Fig. 1, the dispositif of participatory culture

All three domains are interrelated and transform the meaning of participation itself, as well as the meaning of related technologies, their socio-political framing, and their legal regulation (see Fig. 1). As Figure 1 shows, discourses, technologies, and social use (actions) are all interrelated and reciprocally affect each other. The second formation, the actor-network, represents how these relations unfold on a micro-level. The actor-network is employed to map the

different actors engaging in design and appropriation as demonstrated in the example cases. In order to further analyze these relations, this research employs terminology derived from the so-called *Actor-Network Theory* (ANT).[21] Specific formations of various actors within the dispositif of participation reveal to what extent the different elements are interrelated and how they transform the meaning of participation in designing and appropriating, describing or regulating technologies. Perceiving technology not as neutral but as constructed through social and material aspects, affected by many different factors from the developers' culture to legal administration, can be formalized by learning from Actor-Network Theory (ANT).[22]

For ANT, Latour points out, neither the social nor society are given assumptions (2005:37), rather they have to be "reassembled" in the translations an actor-network reveals. One example of a stable factor explaining online cultural phenomena is the metaphor of the *community*, which is often used as the equivalent for the social constellation of family, friends or neighborhood communities in real life in order to describe social interaction and the construction of meaning in virtual life (e.g. Rheingold 1993; Turkle 1997; Jenkins 2002; Benkler 2006). In light of information systems, which are used by a large plurality of people who often do not communicate which each other, the term "community" is no longer sufficient to explain online cultural production.

One explicit assumption made by ANT is the increasingly evanescent distinction between culture and technology (e.g. Akrich 1992; Latour 1991; Latour 1992),

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[21] Developed by Madeline Akrich, Michel Callon, Bruno Latour, and John Law, ANT does not only offer a different understanding of technology but also developed terminology and a set of methods that have to be considered when researching the use of artifacts. Latour clearly distances ANT from other approaches to analyze technology as a *Social Construction of Technology* (SCOT), for example, in which the influential contribution of material aspects to the constitution of culture has been marginalized (Latour 2005b). See Bijker, Pinch 1987.

[22] Assigning agency to technology is not an act of technological determinism but provides a more accurate analysis of the constituents of the culture we experience. See also Rammert (1999), and Sismondo (2004).

which affirms the heterogeneity of our *Lebenswelt,* and the hybrid alliances established within that world. It recognizes relations, labeled as networks, consisting of human and non-human actors and does not significantly differentiate between the two during an initial analysis. In following and tracing actors, non-human actors are handled in the same way as human ones and vice versa.[23] ANT describes all related aspects as "actors", whether human or non-human, and tries to flesh out their relations by monitoring their "traces".

So, for instance, the case example discussed in Chapter 4, following the *Xbox* software development kit that was initially only issued to licensed partners of Microsoft, reveals an entire actor-network of appropriation. Furthermore, it relates the hacking of game consoles directly to the design development at Microsoft and to an emerging and lucrative gray market for modified computer chips for the Microsoft Xbox. This actor-network, in other words, consists of a variety of actors, such as Microsoft, the software development kit, various hacker teams,[24] manifold websites of the console gaming community, producers and distributors of modified chips.

A third formation is identified as the s*ocio-technical ecosystem.* While the actor-network describes a formation of different participating actors, the socio-technical ecosystem deals with large numbers of users and artifacts that constitute an emerging complexity. The term is derived from the concept of a "socio-

[23] To demonstrate this approach one could turn to Bowker's analysis of patents in relation to innovation and market strategies in the field of electrical logging of oil fields (Bowker 1992). The aspects, human and non-human actors, involved in the failing of a large military aviation project are analyzed by Callon and Law (1992). At hand of a science project in the Amazon forest, Latour explains the interrelating chains constructing scientific artifacts, established by methods, tools, categorization, and mapping (Latour 1999).

[24] The word 'hacker' describes in computer culture a person with sophisticated programming skills developing creative solutions to complex and challenging problems. However, popular culture and mass media shaped the common understanding of the hacker, as mainly guys sneaking secretly into computer systems, spreading viruses, and committing so-called cyber-crimes. The malicious use of computer skills is assigned to the so-called cracker. Hackers are also associated with a set of ethical and aesthetical codes and values (Himanen 2001). See also, the Jargon file: hacker, <http://www.catb.org/jargon/html/H/hacker.html>.

technical system", used in management studies and organizational development to describe the interaction of people and technology in workplaces (e.g., Berg 1997; Monarch et al. 1997). Socio-technical ecosystems describe an environment based on information technology that facilitates and cultivates the performance of a plurality of users. Design and user activities are mutually intertwined and dependent in order to improve the overall system. The term socio-technical ecosystem aims to emphasize its hybrid character and increasingly complex system-wide performance. The photo-sharing website *Flickr* constitutes such a socio-technical ecosystem. A system-wide plurality of users is actively engaging in Flickr, but behind the graphical user interfaces on the Flickr servers, information management systems react to user activity. Socio-technical ecosystems can easily be incorporated into other systems. Flickr is connected to the *Yahoo* search engine and influences search requests for images by delivering results, matching the Yahoo user's search request with keywords generated by Flickr users when uploading their photos. Like actor-networks, the socio-technical ecosystem is also subject to the dispositif of participation. It can be an actor-within-an actor-network, while at the same time consisting of actor-networks itself.

Employing the concepts of dispositif, actor-network and socio-technical ecosystems as an analytical framework reveals the complexity and dynamic interconnections of the different constituents of participatory culture. Refusing a writing of media history as a continuous development from passively consuming audiences to actively participating users, this research frames participatory culture in a complex dispositif with unfolding actor-networks and socio-technical ecosystems. Tracing the constituents of participatory culture can best be compared with an undercover detective's work analyzing a syndicate. In that respect it recalls McLuhan's notion of the suspended judgment, which is described as "the technique of starting with the thing to be discovered and working back, step by step, as on an assembly line, to the point at which it is

necessary to start in order to reach the desired object" (McLuhan 1964:69). This research therefore disavows a hasty enthusiasm for users being turned into heroes and starts following the different lines along which participatory culture unfolds, beginning with discussions about participation regarding its material foundations to actual media practice and its affect on established ways of cultural production. By examining the meaning of technology, the discourse represents socio-political debates, expectations and attempts for regulation and implementing technology into society itself. With reference to Latour and Baudrillard, Feenberg it formulates a concept of the *hermeneutics of technology* (Feenberg 1999:84). As Feenberg says, "Technologies of course do have a casual aspect, but they also have a symbolic aspect that is determining for their use and evolution" (ibid.). Technologies therefore do not only have a function, but a meaning too, and if the meaning is lacking, the technology is liable to become inoperable as well. The social relations, ideology, desires and political claims can be found in the artifact's design (see, e.g., Latour 1991). The actual social use of software, software-based products and Internet technologies will be analyzed according to three procedures that shape technology: *Affordance*, *Design* and *Appropriation.* These are terms which differentiate specific aspects in technology development according to the actors involved.

Affordance describes the specificity of technology. Donald Norman introduced the term affordance to describe the very aspects that channel consumers' use (1998). Affordances delineate the fundamental properties that determine how an object could be used (1998:9). He uses a chair as an example of how the design suggests one sits on it. Norman refers in general to the design of objects, which he calls "everyday things," but exceeds that meaning by assigning a material aspect to the concept of affordance. He uses terminology from psychology to refer to the material aspects of an object and the stuff it is made of. He gives the example of British Railways, experiencing acts of vandalism in their shelters. The glass panels were smashed and the plywood-

paneled shelters were defaced by graffiti. Norman blames the psychology of materials, since glass, besides providing transparancy to look through, it can also be broken, and flat, smooth surfaces cannot only be used for building a shelter but are also appropriate for being written on (1998:9). This material aspect, called affordance, determines the design in the first place, before it affects the appropriation by users. Material aspects have to be considered when analyzing the way users would use, change, and modify the designed object. Affordance describes two characteristics, the material aspects, or the specificity of an object or a technology, and the affordance imposed on it through the design.

Design describes the creation and shaping of artifacts. Design creates its own affordances but is also subject to the affordances of the materials utilized. The design process usually involves an evaluation of the specific features of materials used for a designated object, and an evaluation of the user's appropriation to be incorporated into a next level of development. However, software affords many more opportunities for appropriation than other artifacts, which opens a multitude of possible modifications. Furthermore, the process of design is influenced by the engineer's specific social context and socio-political mindset.

Appropriation means that users integrate technology into their everyday practices, adapting and sometimes transforming its original design. It covers the use, the modification, the re-use and further development of artifacts in ways often unforeseen by the original designers (Dix 2007). Reacting to the initial design of an artifact and changing it according to other needs has been described as a common consumer and user activity (Pacey 1983). The material aspects of Internet culture and the effective possibilities for collaboration have only aggravated this practice on a globals scale. Appropriation is related to affordance, because the material characteristics and the design choices affect

the act of appropriation. Design and the specific material qualities form the basis for use and appropriation.

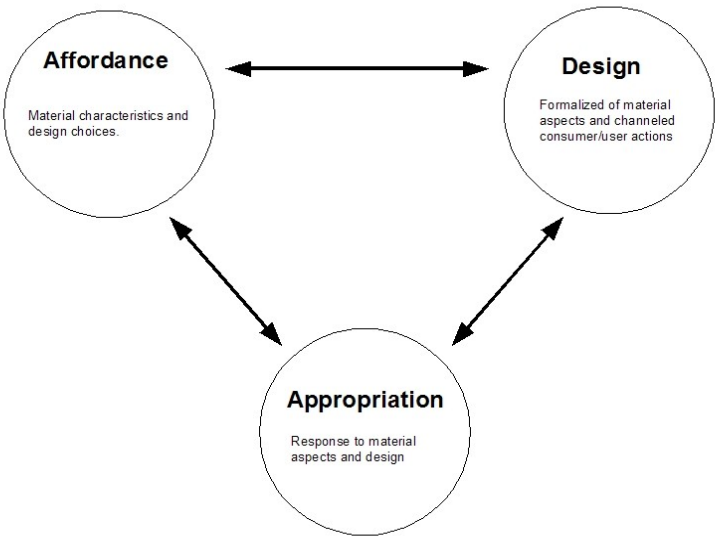

Fig. 2, Affordance, Appropriation and Design

As shown in Fig. 2, affordance, appropriation and design are interdependent. Affordances exists in both, namely the specific material features used for design, and in the design process, which also constitutes affordance. Design is the formalization of anticipated user activities through the use of certain materials or technologies and the shaping of them into artifacts that constitute the designated affordances. The challenge for design is to employ material characteristics accordingly.[25]

[25] A prototypical example of contradictory design will be presented in the case of the Microsoft *Xbox*, a game console, that actually had the typical characteristics of a personal computer but was limited,

With respect to software the interdependence of affordance, design and appropriation actually integrates producers and users, since an act of appropriation can become a design process too. Although appropriation has been described as mainly belonging to the domain of consumers and users (e.g. Pacey 1983; Jenkins 2006b, Ciborra 2002). Modifying original designs can develop into a professional, and in that sense also commercial activity.[26] This constitutes one of the many levels where users and producers are intertwined and where their relationship increasingly obscure. The labor expended in the domain of appropriation affects design processes, and designers can deliberately take advantage of the user's appropriation work. It has been argued that appropriation is crucial for the development of efficient and reliable software (Ciborra 2002; Dix 2007). Instead of just appropriating a design to their needs, users often engage in the process by further developing the artifact in question and therefore partaking in the design. During all stages of development the involved participants can be professional designers employed by a corporate company, individual users, or a collective of enthusiast students, or a user community, a team of hackers, etc. They are all users and producers.

due to its design, to the functionality of a game console. Users hacked and modified the game console in ways unintended by the vendor. Microsoft learned from these acts of user appropriation and formalized several aspects into the design of the next game console, the Xbox 360, aiming to include several forms of game-console use and attempting to exclude others that were more efficient than the older design. The labor of user communities, their innovations and their way of using a device were then formalized into new design decisions and therefore implemented in further developments.

[26] Car tuning is an example for professional and amateur appropriation. In digital culture enterprises provide services for product modification by either selling the necessary components or by selling an off-the-shelf modification. For instance, the Taiwan based company FriendTech offered an enhanced version of Microsoft's Xbox as DreamX. For an description of the altered Xbox, see, Patrick Schmid: FriendTech DreamX, *Tom's Hardware*, May 11 2004, <www.tomshardware.com/reviews/modding-xbox-ultimate-multimedia-center,807-3.html>

Tracing participation

Tracing the relations and activities that take place can be achieved by following as many actors as possible and examining the media texts and artifacts produced within the formations of the dispositif of participation. The dispositif outlined above covers the general framing of participation while actor-networks, unfolding in the presented case studies, will reveal specific formations of actors. The various actors explored in each case example are subject to the general formations of discourses, individual persons, communities, and technologies as outlined in the dispositif. Actual media practices and software designs are revisited in relation to the promise and claim of participation, and its socio-political implications. Technically this research was conducted by following the actors to the greatest extent possible, starting with the most obvious, the media attention for participation and the agenda-setting for new technologies, to the hidden connections between the various participants and the agency of material aspects that so often are easily overlooked. At a practical level, this research proceeded by analyzing the popular discourse with respect to the cultural references (metaphors, associations, images) that are employed to promote the new media. As for the appropriation of technology, case examples were chosen to analyze how users actually alter software-based products. The research was conducted with interviews, an analysis of the design and its appropriation, a study of the ways specific appropriations were represented in the media and an examination how it was perceived by the original designers and the legal departments of the companies involved.

As a consequence of the new technologies and practices a whole range of new sources needs to be examined when analyzing media culture. Conventional media and cultural studies analyze media texts such as as film, television, radio, comic books, music, etc. in order to formulate a critique of media production, inherent ideology or to describe consumer culture. Students of the Internet also focus on all

digital media texts—such as audio, movie, graphics, graphical user interfaces, hence the visual surface of new media—as well as on different kind of texts, namely *software programs* and the configuration of *hardware,* and *technical protocols*, which define the configuration and regulation of information infrastructures that can be analyzed and interpreted, such as conventional media texts.[27] Political statements, policies, corporate white papers, artwork, advertisings, and even metaphors enrich the considered resources, revealing ideological connotations and the framing of technology.[28] *Requests for Comments* (RFC), a database representing developers' discussions on the development and the implementation of Internet technologies, defines technical standards and outlines a procedure for collective decision-making and consensus.[29] This practice has been employed by other collaborative projects as well. *End User License Agreements* or *Terms of Use*, found in most online services and software-based products, make up important aspects of the quality, definition and legal regulation of current media objects. These texts regulate content ownership, whether provided by a company or a user, and they regulate the further use, compensation, and liability of involved parties. *Application Programming Interfaces* (APIs), provided by the designers of information manage-

[27] An example of the qualitative change of digital media texts as opposed to conventional media forms are evident in computer games. It's possible to analyze a game with respect to its visual representation, its game objectives, the representation of gender, power structures, world views or an analysis of alleged narrative structures. However, the entire subject is more complex than suggested on the surface of the game. In order to hack the Xbox, users employed common console games by exploiting errors in their programming code. The software bugs became a means of production for appropriating a piece of hardware.

[28] Since the debate on participation is highly informed by the socio-political claims of the recent "'media revolution", a close look was taken at the representation of ideological aspects. The way promoters of the new media framed technology, their choice of cultural references, images, associations and metaphors to describe technology in speeches, advertising, business talks or policies. Here, a promising rhetoric is constituted advertising new technologies as a means of social progress. In design, as in appropriation, ideological connotations are recognizable but not necessarily present. Surprisingly enough, members of the hacker scene frequently proved to be very pragmatic and less ideologically driven than popular commentators predicted.

[29] The Requests for Comments (RFC) created by the Internet Engineering Task Force are available at <http://www.ietf.org/rfc.html>. The Requests for Comments represent not only a mode of collaboration but also reveal a certain engineering culture, its social codes, and its socio-political mindset, not to mention how it was implemented in the development of technologies.

ment systems, channel the further third-party use of data stored in an information system's database. The APIs were developed to be powerful gatekeepers of information flow and regulate to a large extent how open a system is and what data and functions can be embedded or shared.[30] The *documentation* of software applications, their interfaces for user feedback or user participation, their provided information in the form of *Frequently Asked Questions* (FAQ), *user forums*, etc. are another set of important texts to consider. Other texts include the comments and the communication between developers and producers with their consumers. Thanks to the popularity of blogging, countless *corporate blogs* inundated the Web publishing developing diaries in the tradition of the legendary computer games company *iD Software*. The Xbox development team maintains a weblog, as do the programmers of Microsoft's *Internet Explorer*.[31] The search-engine giant Google maintains several blogs to communicate with its developing community and its users. Corporate policy, and its corporate view on technology regulation, market trends and Internet governance are communicated in a *Google Public Policy Blog*.[32] Along with established producers, users and third parties who further develop the original devices modify them or change their use, publish documentation, comments, and even ideological communication in weblogs and user forums, for example. Users evaluate and discuss hardware, such as game consoles, in modified and non-modified forms, from a perspective of experienced users and from a perspective of media practice claiming their cultural freedom to appropriate the original design.

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[30] Often these APIs are openly available for use and further development, so any interested party can start developing an application using an API. An example would be the social networking site Facebook, which offers a huge platform for the developing community to discuss with the Facebook core developing team. Facebook developers can be accessed at <http://developers.facebook.com/>.
Additionally, a handbook is available for getting started with Facebook API development, or to learn more about how APIs work, see Wayne Graham. 2008. Facebook API Developers Guide. Apress: New York.

[31] Xbox Team: <http://blogs.msdn.com/xboxteam/default.aspx. Ieblog: http://blogs.msdn.com/ie/>.

[32] The Official Google Blog, <http://googleblog.blogspot.com/>. The Google Public Policy Blog, <http://googlepublicpolicy.blogspot.com/>.

All these different texts refer to the process of designing and appropriating software and software-based products. The are not only important to the researcher in order to gather crucial information about these processes themselves but appear also as important actors transforming, changing, and influencing design, appropriation, and public perception. Finally, interviews with persons affiliated with specific communities, companies, or working individually, and thus loosely associated with a scene or group, helped to gain insight into the work processes and understand social and aesthetic codes. Many informal talks took place over the past years at festivals and conferences with different members of various communities.[33]

Structure

Chapter 1 examines how participation is framed as social progress through technological advancement. It scrutinizes the establishment of participation as a great legend of computer and Internet and reveals how opinion leaders (policy makers, activists, artists, business leaders, entrepreneurs, engineers, etc.) contribute to a rhetoric that refers to visionary dreams of technology development. The introduction of products and services related to it emphasize the element of participation, promising access to markets, knowledge, and education, and the neutralization of geographical location and social status. This will not be dismissed as naïve or misleading but rather recognized as crucial in mobilizing attention and capital, and in co-shaping the "imago" of technology.

[33] Interestingly, these spaces are simultaneously platforms for presenting new trends in the field of digital culture and forums for discussing and reflecting its development. They serve social networking as well as knowledge transformation and public representation. *Ars Electronica* 1998, 2000, 2001, 2002, 2003, 2004 (Linz, A); *Barcamp Rotterdam* 2007 (Rotterdam, NL); *[d]vision 2000: Interfaces of Digital Culture, [d]vision 2001: Electronic Kindergarten, [d]vision 2002: Digital Biedermeier* (Vienna, A); *Dutch Electronic Art Festival* 2002, 2004, 2007 (Rotterdam, NL); *Kiev International Media Art Festival* 2000, 2001 (Kiev, UA); *Media in Transition 5* (Boston, MA, 2007); *Parliaments of Art* 2005 (Vienna, A); *Paraflows* 2006 (Vienna, A); *ReadMe Festival* 2004 (Aarhus, DK); *Stuttgarter Filmwinter - Festival for Expanded Media* 2001, 2002 (Stuttgart, D); *Transmediale* 1999, 2000, 2001 (Berlin, D).

Chapter 2 analyzes how the scholarly discourse on participation is infused with the traditional claim for participation. Although the term "participatory culture" has only recently been coined, the issue of consumer and citizen participation in the power structures of media industries and hegemonic politics has already been scrutinized in the first cultural critiques on mass media. The scholarly approach to participatory culture is biased due to an uncritical enthusiasm for user activity, which is too readily accepted as a fulfillment of the traditional claim for participation of citizens in society and consumers in cultural production. Furthermore this chapter regards the current approach, which equates participation with an active audience, as insufficiently capable of capturing the aspect of technical materiality and the dynamic of interrelations between the many participating actors. Consequently it advocates revising our understanding of users regarding skills, social context, and power relations. User activities will therefore be defined as either *explicit* and *implicit* participation. In mapping user activities, Chapter 2 will distinguish participation in terms of production processes as either *accumulation*, *archiving* or *construction*.

Chapter 3 investigates the constituents of participation on the level of technology. It shows how the characteristics of *computer*, *software* and the *Internet* provide basic premises for a participatory culture. What can be described as technological nature makes a significant contribution to the way techniques are used and practices are developed. This chapter will demonstrate to what extent technology has actively taken part in shaping the cultural practice that has emerged over the past two decades on the Internet. Technological determinism is consequently refuted, as well as the belief in a social construction of technology. Instead, it recognizes a social construction created by human and non-human actors, and reviews participation in terms of *affordances*, *design* and *appropriation*.

Chapter 4 demonstrates design and appropriation by way of case examples

ranging from explicit participation (game console hacking) to implicit user participation in information management processes. These cases illustrate to what extent computer technology and software, in tandem with the Internet, create the possibility of countless concatenations between the various actors involved. This chapter shows that participation is *heterogeneous* with respect to methods, participants, and motivation, and *hybrid* with respect to collaborative human and non-human formations. It furthermore reveals significant interrelationships between corporations, user communities, media platforms, and socio-technical ecosystems, and it argues for a perception of participatory culture as an extension of the established cultural industries.

After the adaptation of technology and user participation have been examined, Chapter 5 will deal with the resulting dynamics. The extended culture industry develops different dynamics to respond to user participation. A conservative reaction is defined as *confrontation*, often recognizable in the actions of industries whose business model is severely challenged through the material characteristics of digital artifacts, such as the music and film industry. The cases discussed as *implementation* shows to what extent media corporations are able to shift from content creators to platform providers for user-created content, and how they channel user activities in software design. The strategy presented here as *integration* reflects a new approach to cultural production, thriving on collaboration among user communities and developing a culture of participation based on mutual acceptance, objective discussion, and shared values.

Concluding this book raises the question to what extent the knowledge of technology and the related media practices, that are developed and shared in the extended culture industry, can be transformed to a process socio-political integration. Consequently this book calls for a society-wide debate on the constitution of a technological leitmotif that respects and legalizes the cultural practice developed during the past decade.

1. Promising revolutionary change

> We will create a civilization of the mind in Cyberspace. May it be more humane and fair than the world your governments have made before. (Perry Barlow, Declaration of Independence of Cyberspace, 1996)

New technologies spread by word of mouth. Legends, myths and narratives accompany the new technology while it is still in development and announce it to a broader audience in society, to its potential users. Many stories have been told imagining futures and drafting possible trends in the use and development of technology (Barbrook 2005). The pursuit to bring technology to perfection and to constitute a utopia through engineering has been recognized as an important agent of change (Peters 1999, Daniels 2002; De de Vries 2008).[34] Metaphors, associations and images create a certain imago of technology. They are part of a *rhetoric* that can be recognized in descriptions of technology or *new media* in popular discourse. Referring to past media revolutions or a culturally constituted imagination of technological progress they are often familiar, and thus comprehensible for audiences and easily employable for promoters.[35] McLuhan described our limitation for perceiving the future only in terms of past

[34] Whether a positive or negative utopia is depicted depends on which terminology, images, and associations are chosen to imagine and present the new media. In view of participation a negative utopia manifests itself as the dark side of the tempting promise for social progress, as the potential abuse of technology for repression. However, popular discourse rarely touches upon this. Rather, it promotes a positive utopia. The new media, the Internet, the personal computer, but also the mobile phone and wireless communication entered popular discourse in tandem with a rhetoric of promise which envisioned a brighter future.
For the rhetoric and the promised utopia about wireless communication, see Imar de Vries (2008). And for a review of the unfulfilled promises of popular discourse on technology, see Richard Barbrook (2005), Imaginary Futures. From Thinking Machines to the Intergalactic Network.

[35] Science fiction texts from Jules Verne to William Gibson, alternative concepts of society from Thomas Morus to 1960s counter-culture, and images from Fritz Lang's *Metropolis* to the Wachowski's *Matrix* contribute to this and are representative of the current debates.

developments, as if we looked "at the present through a rear-view mirror" (1967:74). A rich cultural repertoire of images, associations and narratives informs the present rhetoric of participation and information technology.

The framing of new technologies occurs in two types of discourse, a popular discourse aimed at a broad audience, which introduces and promotes new technologies on a large scale, and a scholarly discourse, which examines their social use. However, both discourses tend to cross over, due to a lack of specialized scholarly discourse on the topic and the need to create attention for both the emerging media and its academic framing.[36]

Promoting and building information technology has unfolded simultaneously. With respect to the so-called "second coming" of the Internet in the form of *Web 2.0*, the imagination and promotion of this technology's prosperous future and its beneficial use can be seen as inseparably linked to the technology's own development.[37] Therefore, promoting the Internet revolution while still in progress required the creation of a suitable language, a rhetoric that made an Internet future comprehensible to a large audience, that mediated things that seem so natural today.

The first time an interested public could have a glance at the new information infrastructure and its potential effects was the 1991 special edition of the *Scientific American* entitled "Communications, Computers, Networks," featuring articles by Al Gore, Nicholas Negroponte, Vint Cerf, Mitch Kapor, and Alan Kay.[38] In 1994 the Superhighway Summit held at UCLA's Center for Communi-

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[36] A key example is Nicholas Negroponte's book *Being Digital*. Despite being written by a respected scholar it targets a broad audience and hardly meets the need for scholarly reflection and analysis, but instead promotes a utopian future of digital media and their impact on society (1996).

[37] Web 2.0 is coined by Tim O'Reilly to describe a development of the WWW where web-designers employ a set of technologies, Asynchronous JavaScript and XML (AJAX), to provide enhanced services. Web 2.0 commonly describes web applications which enable users to create and share content, and can actively employ data streams for their own websites.

[38] Scientific American: Communications, Computers, and Networks, 265 (3), September 1991. The range of occupations and the different backgrounds already indicate the broad nature of agenda

cation Policy demonstrated the Clinton/Gore administration's efforts to set communication technology on the national agenda. In his speech Al Gore outlined the main regulations that were being established by the governing administration for dealing with the Information Superhighway, emphasizing the role of entrepreneurs and free market principles.[39] Along with the popularization of information technology in special interest and mainstream media, politicians already saw the implementation of an information infrastructure on their horizon and started to conceive regulations accordingly.[40]

In communication theory the concept of *agenda setting* is used to describe the effects of mass media on the dissemination of political ideas, the shaping of public perception of individual politicians and their policies. The term describes how issues come to the awareness of a broader audience and how the mass media actively drive the process of generating attention and decision-making (Shaw, McCombs 1977). Although the mass media are crucial for communicating current trends in technology development and creating the necessary

setting. A scholar (Negroponte), a politician (Gore), a computer scientist (Kay), a programmer and activist (Kapor), and an Internet pioneer (Cerf) cover a wide field of topics and potential applications of an electronic information infrastructure. Alan Kay portrays possibilities of using computer networks for teaching children and how these technologies could enable and stimulate kids to teach themselves, and Mark Weiser sketches a future of ubiquitous computing, which will see the computer of the 21st century as a pervasive technology accessible from many different tools in all kinds of situations. While Al Gore introduces the Information Highway, Mitch Kapor, co-founder of the *Electronic Frontier Foundation* (EEF), claims civil rights for the concerned citizens of the new Cyberspace

Kay, Alan: Computers, Networks, and Education, Scientific American, Vol. 265, No.3:100-107.
Weiser, Mark: The Computer of the 21st Century, Scientific American, Vol. 265, No. 3:108-111.
Gore, Al: Computers, Networks and Public Policy: Infrastructure for the Global Village, Scientific American, Vol. 265, No. 3:150-153.
Kapor, Mitch: Civil Liberties in Cyberspace: When does hacking turn from an exercise of civil liberties into crime?, Scientific American, Vol. 265, No. 3:158-164.

39 Gore, Al: Speech delivered at the Information Superhighway Summit at UCLA January 11, 1994. <http://www.uibk.ac.at/voeb/texte/vor9401.html>.

40 In 1995 at the G7 Ministerial Conference on Information Society in Brussels, some basic principles were agreed on for engaging the emerging information infrastructures. At a national level, initiatives were formed in many countries to promote and organize the diffusion of information technology and to adopt the basic principles, which were outlined as "Perspectives On The Global Information Infrastructure." See "Perspectives On The Global Information Infrastructure" at <http://www.ntia.doc.gov/oiahome/Giiagend.txt>.

attention for the demand and adoption of technology, they are not the only factors in agenda setting.[41] Many different actors play a part in the framing of technology. Advertisements, manifestos, and policies formulating a promise of participation refer to the technological imaginary. Here metaphors, images and associations are used to create a picture of what the Internet or the World Wide Web will be for citizens and consumers.

But the challenge is to imagine and mediate a subject that is often even unclear to its own promoters and completely unknown to most of the audience. When the Internet and the WWW became a subject of mainstream media, journalists used an entire new vocabulary and cultural pool of associations that already shaped and described the new technology.[42] Early metaphors affecting the perception of media include the computational metaphor, which is a linguistic and semantic transformation from the concept of human accountant to an electronic calculator.[43] The humanization of the machine, which overemphasizes the labor involved in processing accounting tasks and which was formerly conducted by humans, was an attempt to coin the metaphor of the *electronic brain* (Hally 2005:85, 101). The term *World Wide Web* itself is a metaphor, using the picture of a *web* clamped around the globe.[44] The network metaphor

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41 For a recent account dealing with agenda setting consult the special edition on the topic in the Journal of Communication, Vol. 57 Issue 1 (March 2007).

42 1995 was a turning point in the development of these technologies. Channeling the process of WWW technology developments, the W3 Consortium had already started coordinated activities in 1994; Between 1995 and 1996 the number of web servers increased tenfold (from approximately 10,000 to 100,000 and to 1.6 million in 1998) and the WWW was the main theme of the G7 meeting in Brussels in 1995. See W3C: A little history of the World Wide, Web, <http://www.w3.org/History.html>.

43 Metaphors structure the world we live by and how we talk about it (Lakoff, Johnson 1980) and that is true for our technology as well. See also Marianne van den Boomen. Forthcoming. Transcoding the Internet. How metaphors matter in digital praxis.

44 Overcoming distance by wiring the world was a driving ideological force behind Samuel Morse's invention of the telegraph. His anticipated global neighborhood is often implicitly present in the enthusiastic accounts of the social benefits of the Internet, which resemble McLuhan's metaphor of the global village. (See also Daniels 2002:40)

was also influential, which became synonymous for the changes taking place in a society perceived as an organization of networks (Castells 1996-2000). Of the many metaphors used to describe communication and information technologies, two were successfully employed and embedded in popular discourse: *Information Highway*, coined by the Clinton/Gore administration and *Cyberspace*, popularized by science fiction writer William Gibson. Cyberspace denotes a blend of cybernetics and space which identifies that element of space which creates information machines and communicational feedback, "a consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts [...] A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity" (Gibson 1984:51). Perceiving the information technology as a new space allows to portray users as citizens cultivating, inhabiting and developing it. Cyberspace proved to be a powerful metaphor in promising a new space to realize utopian concepts (Chun 2006:28).

The metaphors *hyperspace*, a space above the familiar real-world space, or *augmented reality*, a reality enhanced by ubiquitous information services, creating an Infosphere, were popular alternative terms.[45] The *Information Highway* recalls nationally organized transport sectors, controlled and hierarchical structures and bureaucratic regulation. This last metaphor has been criticized for its limited capability of imagining the use and shape of future technology and for being too narrow by virtue of its relation to bureaucratic organizations (Dyson et al. 1994). In their text *A Magna Charta of the Knowledge Age*, Dyson, Gilder, Keyworth, and Toffler analyze the Cyberspace and Information Highway metaphors, finding the latter inappropriate for facing the new material challenges of online social and political organization, whereas, the cyberspace metaphor typifies a spatial perception of a new world, rather

[45] Lévy divides the hybrid lifeworld into territorial space, commodity space and knowledge space (Lévy 1998:5-7).

than an understanding of new highways that would be maintained and administered by bureaucrats (Dyson et al. 1994). The function of these metaphors is clear, and what Bruce Sterling acknowledges for cyberspace is true the Information Highway-metaphor as well:

> The word 'cyberspace' is a sleek container for all kinds of suspicious techie marvels—notions with radically different premises—and considerable commercial promise. People—some of them, millionaire entrepreneurs—are in technophilic ecstasy, boldly comparing 'cyberspace' to the telephone, the automobile, the Wright flyer, the personal computer (Sterling 1990:54).

The Information Highway was yet another sleek container, though it had a bureaucratic tint, a state-mediated project but in favor of free market economy and commercial application. Metaphors are not neutral or passive, and the choice for or against a metaphor entails important design and regulation decisions:

> We are on the verge of a revolution that is just as profound as the change in the economy that came with the industrial revolution. Soon electronic networks will allow people to transcend the barriers of time and distance and take advantage of global markets and business opportunities not even imaginable today, opening up a new world of economic possibility and progress.[46]

The rhetoric is used by different persons, organizations, and institutions to describe and label the technology and its use in a society-wide debate. A bard such as John Perry Barlow dreamt of a new and better world, politicians such as Al Gore promised a fast ride on Information Highways into a rosy future, while a pioneer and activist such as Mitch Kapor recognized the need for socio-political representation and citizen rights on the electronic frontier, and business leaders such as Bill Gates anticipated "business at the speed of thought." The way media and technologies have been presented reveal an expectation of

[46] Vice President Albert Gore, Jr. in President William J. Clinton and Vice President Albert Gore, Jr., A Framework For Global Electronic Commerce, 1997, retrieved via Archive.org: <http://web.archive.org/web/20011212071309/http://www.iitf.nist.gov/eleccomm/ecomm.htm>

socio-political progress through technological development. The various participants from the worlds of business, journalism, politics, or activism and art provide a rhetoric that addresses and communicates the new technologies. Their statements and the way they present technology have a profound effect on developers and designers attempting to devise solutions that fulfill the proclaimed promises. Those concepts were addressed by prominent spokespersons who would fast became identified with the new media and the new economy, sometimes referred to as the *digerati* (Brockmann 1996). Fred Turner convincingly shows how counterculture and business converged during the early development of personal computers. Young entrepreneurs and activists teamed up to produce tools for a 'new frontier', entering virgin social and technological territory (Turner 2006). Coming from the most divergent fields related to computer and information technologies, these diverse groups of scholars and writers, entrepreneurs a.nd publishers, activists and politicians, programmers and engineers very much dominated the debate on the implementation of the global information infrastructure.[47] The media appearances and publications of opinion leaders and prominent techno-advocates contributed to the semantic constitution of associations and metaphors for describing, perceiving, and experiencing technology. A plethora of texts was produced by these advocates describing what the Internet and the Information revolution was about and which changes society would undergo during the transformation to an information society.[48] The second coming of the Internet as Web 2.0 has a similar

[47] An arbitrary list of digerati would include Nicholas Negroponte, Sherry Turkle, Sadi Plant, Donna Haraway, Howard Rheingold (scholars); Esther Dyson, John Markoff, John Brockmann, Cory Doctorow, Douglas Rushkoff (writers); David Bunnel, Kevin Kelly, Tim O'Reilly (publishers), Bill Gates, Steve Jobs, John Chambers, Scott McNealy, Larry Ellison (entrepreneurs), Richard Stallman, John Perry Barlow, Eric Raymond, Al Gore (activists and politicians), Tim Berners-Lee, Linus Torvalds (engineers).

[48] An incomplete list of these texts would include books by Howard Rheingold, Virtual Reality (1991); The Virtual Community (1993) and Smart Mobs (2002); Nicholas Negroponte's Being Digital (1995), Kevin Kelly's New Rules for the New Economy (1998); Esther Dyson, Release 2.0: A Design for Living in the Digital Age (1997); Bill Gates' The Road Ahead (1995), Business @ the Speed of Thought (1999); Sherry Turkle's Life on the Screen: Identity in the Age of the Internet (1995), Donna Haraway, A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth

dynamic. A flying circus of the usual suspects spread the gospel about the next new thing.

Technology is expected to solve many social problems and abolish many obstacles created by social interaction and power structures. Drawing on psychoanalytical theory, French sociologist Patrice Flichy conceived the concept of the *technological imaginary* to describe the "collective" imagination of technology (Flichy 1999). The technological imaginary is constructed by the expectations and projections for cultural and social advancement and manifests itself as an immaterial aspect of technology. It pervades the discourse on technology, whether in popular texts, journalists' articles, the work of artists, debates at conferences and board meetings, and the slick presentation of marketing professionals. It finds expression in the policies of political administrations as well as in the manifestos of activists. The promising rhetoric used to promote the new media in the 1990s represents a technological imaginary that refers to the ideal of egalitarian access to means of information and the freedom to communicate beyond all geographical, political and educational boundaries.

The new technologies have been promoted in the mass media and have stimulated the creation of many new special-interest media, the most popular probably being chief editor Kevin Kelly's *Wired* magazine, which features and supports many of the key players in popular discourse and the computer and software businesses.[49] In *Wired* the amalgam of counterculture and business found a medium with roots in in Stewart Brand's hippie magazine *The Whole*

Century (1991), William J. Mitchell, City of Bits (1996), Douglas Rushkoff, Cyberia: Life in the Trenches of Hyperspace (1995), Children of Chaos (1997), Sadie Plant, Zeroes + Ones: Digital Women and New Technoculture (1997), Cory Doctorow, Down and Out in the Magic Kingdom (2003).

[49] It is noteworthy how the emerging technologies are producing their own branch of special interest print magazines. Already the wireless telegraphy lead to publishing of magazines, such as Wireless, the advent of radio was accompanied by special interest magazines as well, and that is also true for computer, Internet, the various game consoles, and operating systems. Different Linux magazines are as well available as publications on Windows, and Mac OS. Those media are crucial actors in the popular discourse on new technologies.

Earth Catalog and *The Whole Earth Review*. Later dubbed the Californian Ideology (Barbrook, Cameron 1995) *Wired* magazine's philosophy attempted to link counterculture politics with the polished new economy entrepreneurship, along with a libertarian, evolutionary-Darwinesque philosophy spiced up with a new communalist ideal (Turner 2006: 195). As Turner has pointed out, concepts of social utopia, the free flow of information, the ideal of access to resources and the sharing of information were developed within the counterculture of the 1960s and merged with an emerging entrepreneurship largely rooted in the hobbyist communities of computers and electronics. The counterculture entrepreneurs believed computers should be personal tools, useful for one and all, thereby enabling the advent of the common user. Though this target group eventual proved to be a source of profit, it was initially chosen for ideological reasons: to relinquish the means of production to the people.

Participation and socio-political progress are some of the new technologies' recurring promises. They propel creative talent and act as alluring arguments for the introduction and diffusion of new technologies (Daniels 2002). The development of the computer into a mass medium was highly driven by the desire to enable future users to develop better ways of achieving labor objectives (Engelbart 1962; Licklider 1965; Papert 1980), but also by the idealistic desire to achieve social progress and egalitarian access and participation (Nelson 1974; Kay 1972). The Graphical User Interfaces so common in today's computers have been developed very much from a perspective of allowing users to participate in the creation and use of knowledge (e.g. Nelson 1974/1987; Kay; Goldberg 1977/2003).[50] During the development of the Internet developers were already implementing their expectations for socio-political change into the basic design of the technology, where "initial choices were profoundly

[50] It is worth mentioning that many of the claims made for the personal computer during the late 1970s and early 1980s are again being used to promote the One Laptop Per Child Project (OLPC): <http://laptop.org/vision/mission/>.

marked by the representations of these actors who dreamed of a communicating, free, universal and non-hierarchized network" (Flichy 2002:201). The counterculture of the 1960s recognized in computer technology and information networks the potential for realizing many of their ideals of social progress, freedom of information, access to education, and a means of conquering both social injustices and geographical disadvantages (Turner 2006). This utopian vision gave important meaning to the new media, and contributed to the 'imago' that was communicated in countless advertisements, manifestos, policies, and media coverage in the emerging new market in the 1990s. The promise of participation was crucial to the discourse inherent in the implementation of the Internet and the World Wide Web, and it is also inherent in the developers' culture and the many design decisions they make while constructing these technologies. It was used for promoting the new technology and explaining alleged beneficial effects to large audiences. The technological imaginary is therefore represented in the way opinion leaders communicate new media to their audiences and in the way engineers design technology. Obviously reality does not uphold the promises of the technological imaginary, but it has been convincingly argued that the formulation of utopia alone is crucial for developing and designing technology (Daniels 2002:31). Although the socio-political expectations have not been met yet, the present need for them is an important agent for change and development.

The idea of increasing possibilities for participation has been formulated from different perspectives and is a key aspect of the new technologies' promise for social improvement and the abolishment of inequality. References to past media revolutions and images of social uses of technology were marshaled to create an imago for the technologies to come. However, the way participation seems is conceived takes on a variety of guises. The first era promoting new technologies and the Internet from the early 1990s to the decline of the new economy in 2001, defined participation as access and connectivity. Participation was

presented as a major opportunity for citizens, entrepreneurs, and consumers to improve socio-political reality, business opportunities, and media consumption through connectivity. Accessing information online or using computers for self-education, connecting to overseas business partners, and plugging into remote markets were popular themes in imagining the uses of technology. Participation was a major rhetorical trope in promoting the so-called information revolution. It became a great legend of information and computer technology, highly tangible visible not only in the policies of politicians and visionary accounts of artists but also in the communications of corporate companies. The often almost evangelical impetus discernible in corporate media campaigns for the Internet and computer technology is closely related to the cultural heritage of the counterculture and libertarian entrepreneurship (Brockmann 1996; Castells 2001; Turner 2006). It became a popular narrative thriving on the tempting promise that changing the world for the better and making money aren't mutually exclusive. In the following phase, characterized generally by the label Web 2.0, the connotations attached to the idea of participation shift: now collaboration and social interaction have become its core elements, and thus brought forth a slightly different type of discourse. This shift can be clearly recognized in two campaigns promoting the ICT company Cisco System.

Cisco Systems: Empowering the Internet Generation

The glorious future described in Gore's promising words was represented in the advertisements, business talks, white papers, and publications of ICT companies and their spokespersons. The network metaphor was used to describe a new step in globalization, the creation of a worldwide information infrastructure that would abolish the disadvantages of local bondage and physical barriers. The promise for participation became a key motive in promoting information technologies. Prime examples are Cisco Systems' campaigns from the mid-1990s and the recent Web 2.0-related campaign exemplifying the framing of new technologies in terms of a technological imaginary.[51] Cisco Systems is a perfect example, among the enormously prospering ICT companies, of how to build the physical network, the Internet, and simultaneously establish it as an enabling technology, potentially empowering every user.[52] Their advertisement

[51] This was not unique to Cisco Systems but was a recurring phenomenon in promoting technology to mass audiences and can be found in images promoting wireless communication in the early 20th century and in AT&T adverts praising the telephone or campaigns for television in the 1950s.

[52] Founded in 1984 by Len Bosack and Sandy Lerner, two computer engineers from Stanford University, the company became the market leader in producing multi-protocol routers, and by 2000 Cisco Systems was the world's most valuable company. The legend goes that Bosack and Lerner produced the first router in their living room to facilitate communication between their two computers. In the 1990s Cisco Systems developed in tandem with the growing World Wide Web by offering products facilitating networked computing. Cisco Systems, as well as other innovative computer and telecommunication companies and online services, was able to exploit the opportunity of transferring business to the World Wide Web (Castells 2001:68). Using the company's website as a key interface between them and their customers, handling most requests, support, and orders online, the company saved money and increased the speed with which they handled customer requests and subsequently expanded their business opportunities. Castells notes that although the success of Cisco Systems is due to good engineering and excellent products, their Internet-focused business administration was the key to their commercial success (2001:69). With their CEO John Chambers, Cisco Systems installed an advocate for electronic commerce and cutting-edge technology development. In countless media appearances, at conferences and business fairs as well as in boardrooms Chambers repeated his mantra "the Internet will change the way we work, live, and play." Chambers made the cover of Fortune Magazine in May 2000 and was praised as the man who "has created a company that is nothing less than a money-making machine." Personalizing an enterprises' performance and communicating the company's objectives became the major motive for CEOs to make media appearances, who became the equivalent of rock stars during the boom years of the new economy. The leaders of the new economy made the front pages of *Wired* magazine, *Time* magazine and *Business Week*. Andy Serwer: There is Something About Cisco, Fortune, May 15 2000, <http://money.cnn.com/magazines/fortune/fortune_archive/2000/05/15/279729/index.htm>.

campaigns represent the technological imaginary and demonstrate how metaphors and associations can construct a technology's imago. Moreover Cisco Systems found ways to speak of the Internet to a broad public in a comprehensible language and chose pictures that imagined a possible future. Although this was the key message of Cisco's communications, both campaigns – the 1998 campaign and the Web 2.0-related campaign of 2005 – emphasized participation differently.[53] In the first one, the idea of connectivity and access appears in various forms: developing nations were to gain access to the global electronic market place, which in a neo-liberal ideology would be be a fair and democratic institution, where the best producers could distribute the best products for the best prices. The Internet promised connection to remote marketplaces, overcoming geographical distances, and access to knowledge resources through online learning. Cisco Systems emphasized the aspect of access and the possibility of actively participating in the new information space, which was mainly characterized as a marketplace and a knowledge space for learning and education, but also as a network to play in. The advertisements reveal metaphors and signifiers that refer to the official vision of the Information Highway as endorsed by the Clinton/Gore administration. So several key themes can be identified in Cisco's advertisements:

1) Access and participation due to new technologies
2) The development of new business opportunities
3) The global connection of markets and people

However, the bubble of market capitalization had already reached its bursting point by March 9 2000 (NASDAQ) and a year later in April 2001 Cisco's stocks devalued by more than 70% and the company was forced to lay off 8,500 of its 44,000 employees.

[53] The two different campaigns discussed here are entitled "Empowering the Internet Generation" from 1998 and "The Human Network" from 2006; see the campaign website, which resembles the style of web blogs <www.cisco.com/web/thehumannetwork/>.

In the advertised world of Cisco Systems, social and geographical disadvantages can be compensated by technology.[54] The first major campaign, "Empowering the Internet Generation", was launched in 1998; TV spots were used to promote the Internet and its endless possibilities. The title already indicates an evolutionary progress, a new generation adapted to technology (the Internet) and the prospect of socio-political change (empowerment). The TV spots consist of fragments of a monologue spoken by persons from different nations with different accents. Each utters a short fragment of the monologue, which in turn makes up a narrative of the Internet:

> There are over 800000 jobs openings. For Internet specialists. Right Now. Three million more in the next five years. By the time I am eighteen over a billion jobs will require Internet skills.

The monologue connects the images of speakers from different nationalities in their different locations. In the following sequence another series of different speakers pose a question to the camera: "Are you ready?" The spot continues:

> Virtually all Internet traffic travels across the systems of one company. The same one sponsoring thousands of networking academies. Cisco Systems. Empowering the Internet Generation.[55]

According to this advertisement Cisco is not only building the hardware and software for the Internet, Cisco is also enabling people to learn how to use the Internet and is connecting virtually everybody on the planet, thereby diminishing access barriers to education, markets, and social communities.[56] The message

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[54] *New York Times* columnist Thomas L Friedman reiterates this vision in his popular account of the economic and political impact of telecommunication infrastructures in his 2005 book *The World is Flat* .

[55] Another example from the fragmented spoken monologue is: "Over 17 million people received an education on the Internet this year – Across the world seven out of ten students say they are getting better grades – One day some training for every job on earth will be available on the Internet." Wendy Chun points out that viwers confronted with the recurring 'Are you ready?' had to perceive the Internet as a desirable but competitive place (2006:255).

[56] For a c critical examination of Cisco advertising, see Robert Goldman, Stephen Papson, Noah Kersey (1998/2003) at <http://www.lclark.edu/~goldman/global/pageslandscapes/ciscoscapes.html>.

was widely disseminated and reached consumers far beyond Cisco Systems' actual target group. The early Cisco campaigns emphasized participation in terms of diminishing geographical distance and providing access to information; the more recent campaigns emphasize potential collaboration, but even more the possibility of being together while geographically far apart. They promote a notion of generating meaning through sharing special moments, leading to creativity and contributions to collaborative works. The "Empowering the Internet Generation" campaign presented participation as access to education and business opportunities through connectivity, but the "Human Network" campaign shows participation in a global society as contributing to a collective knowledge resource, communicating and collaborating over far distances, and maintaining a state of perpetual contact, thereby enabling the sharing of special moments and emotions and achieving common objectives. Many popular user activities familiar from Web 2.0 applications are featured in Cisco's advertisement clip "The Human Network". A children's voice-over comments on a series of scenes, maps are shown which are rewritten as Google Maps, books are displayed which rewrite themselves, such as the editing of a Wikipedia article, and home videos are published. Again a new world is promised created by the enabling technology and driven by the participation of its users:

> Welcome to a place where books rewrite themselves, [...] welcome to a place where a wedding is captured and recaptured, again and again, where home video is experienced everywhere at once, where a library travels across the world, where businesses are born, countries are transformed, and we are more powerful together than we ever could have been apart. Welcome to the human network.

In Cisco spots, connectivity describes people, extinguishing time zones and space, enabling unhindered access to the sharing of ideas, playful interaction and communication from anywhere at any time. Most important is the emphasis on the empowering and enabling quality of information networks with respect to participating in economical and educational progress. The images, associa-

tions, and metaphors Cisco is using in the campaigns fit into the rhetoric used in the popular discourse on the Internet and simultaneously complement it and resemble those used by other ICT companies (Goldman, Papson, Kersey 1998/2003; Cock, Fitchett, Farr 2001). Presented as both a revolution and techno-Darwinist evolution—globalization and deterritorialization, social use, and user activities displayed in the campaigns constitute the public perception of information technology.

The Cisco Systems advertisements show how a technological imaginary, the projection of social and economical progress, is projected onto technology. Translating the promise of participation into pictures of children, students, and business people prospering well from the global information infrastructure was supposed to explain why every individual should acquire Internet skills and why each company should alter their business accordingly. The campaigns confronted an audience already aware of the new technologies due to agenda setting in popular discourse. At this point, Cisco Systems attempted to inextricably associate its name with the Internet and its socio-political agenda, promoting both the Internet and the company. While creating a standard vision of common users and citizens and small-sized businesses to meet the common interest in technological development and its effects, Cisco Systems comprehensibly translated current developments in information technology. Cisco Systems itself participated significantly in shaping the information age by:

a) Developing crucial backbone technology

b) Establishing a business model which can be seen as a prime example for the next new economy

c) Promoting the Internet to the public and pushing an imago of the technology

A surprising aspect of the Cisco Systems campaigns is that they focused on a

broad audience far beyond their usual target group. The large scale of the campaigns, as well as the "Empowering the Internet Generation" slogan, and the most recent successor, i.e. "The Human Network", more resemble a wake-up call for the promotion of the Internet and its social use as such, than simply an advertisement for Cisco Systems' products. In order to sell their Internet-related products, Cisco, as well as other IT companies, were forced to first explain what the Internet precisely was and what it was good for. During the 1990s, innovative information and communication technology companies developed terminology that identifies the Internet as a global marketplace and describes the transformation from the industrial age to the information age as evolution, revolution, and a process of speed (Cock, Fitchett, Farr 2001).[57] They participated in constructing narratives of a technological revolution, and their advertisement represented the technological imaginary, in so far that information technology promised economical prosperity, social improvement and global democratization. However, the promotion of participation, social progress, and global democratization in such campaigns stands in stark contrast to allegations that IT companies such as Cisco Systems, Yahoo, Microsoft, and Google are providing the means for and are actively participating in surveillance, censorship, and repression in undemocratic countries.[58]

[57] Analyzing over a hundred of these companies' print ads in the UK *Financial Times*, Christian de Cock, James A. Fitchett, and Matthew Farr recognized a "discourse construction" that spread the terminology of e-commerce, pushing the lower-case e (as in e-business, e-commerce) as a signifier for a commercial application on the Internet (2001: 211). ICT therefore actively participated in constructing the words and terminology used to describe the new technology and what it can be used for. In describing the possible solutions for using new technology, ICT companies pushed the reorganization of business administration in respect to information technology (2001: 213). Using best-practice examples of ICT applications,the ads showed how much money a company could save or how new business could be developed by subscribing to the products and services of ICT solution providers. On a more semiotic and ideological level, advertisements from the boom years referred to the aspect of revolutionizing the organization of the world in terms of globalization and the speed of transactions.

[58] The so-called "Gang of Four" - Microsoft, Yahoo, Cisco Systems, and Google – help to create the "Golden Shield" , also called the "Great Firewall of China", which separates the Chinese Internet from the world's information infrastructure. An estimated 40,000 policemen are patrolling the online world and suppressing links to websites critical of the regime and controlling users' communications. Western companies were criticized for collaborating with a dictatorial regime. See *Wired* <http://www.wired.com/techbiz/media/news/2005/07/68326>, and *Reporters sans Frontiers*:

The effect of popular discourse should not be underestimated. Although it often promotes an unattainable utopia, it has a profound effect on market capitalization and creates attention for socio-political change, which is in turn embedded in civil society's call for increased responsibility, transparency in political decision-making processes, and the right to use and alter new technologies. In line with this, participation emerges in scholarly debates, often in the form of cultural critique and an anti-hegemonic stance. This debate is crucial for an understanding of the concept of participatory culture in media studies.

<http://www.rsf.org/article.php3?id_article=10749>.
See also Naomi Klein: China's all.seeing eye, in Rolling Stone Magazine, May 29th 2008, <http://www.rollingstone.com/politics/story/20797485/chinas_allseeing_eye>.
Klein describes how US companies collaborate with Chinese enterprises in developing and producing surveillance products. The Chinese industry is eager to serve other market areas, and its products seem to be ready to exported to democratic societies, where the aftermath of 9-11 and US war on terror already have created an atmosphere of security paranoia. However, democratic countries are in danger of importing China's repressive political model along with Chinese surveillance equipment.

2. Cultural critique and media technology

The previous chapter presented participation as the grand narrative of new technologies, showing how the promise of participation has been used to promote these new media. The popular discourse framed information technology in terms of traditional democratic values, freedom and egalitarian access to knowledge and markets. It affects the scholarly discourse to the extent that it creates a rather moralistic framing or conversely some kind of romanticism in describing the emerging cultural practices. Especially in a blurring field of popular and scholarly discourse this constitutes a debate polarized between a utopian and dystopian approach (Müller 2009). As the current chapter will demonstrate, the expectation for social progress through technological development represented in the rhetoric analyzed earlier is very much visible in the scholarly debates as well.

The concept of participation is entangled in the many discursive threads that are spun between the artistic avant-garde, political activism, cultural critique and the actual development of technologies. Therefore it does not appear as a clear-cut theoretical framework, but rather in the form of written manifestos, postulated claims, and analytical critiques, and in the actions of artists and activists. A definition or an understanding of participation as an applicable concept for citizens, consumers, audiences, and employees taking part in the processes of political organization, consumption, and production should emerge along these lines. In the different branches of academic discourse, participation emerges as the interaction between two domains of unequally distributed power.[59] While it seems clear that

[59] In management studies and business administration, participation refers to the active involvement of employees in management and decision processes. A differentiation is made between direct and indirect participation, which refers to the direct influence of individual employees or the representation of a large number of employees through representatives., referred to as *employee participation* or *worker participation*. In political studies the term participation describes the active involvement of citizens in political organizations and decision-making processes. As e-participation the phenomenon raises new possibilities for citizens to take part in administration and decision-making processes online.

both the domain of capitalist production and the domain of public administration prefer to seek ways of controlled or weak participation in order to improve the efficiency of their respective systems, participation is not limited to an understanding of delegating administrative processes to citizens and employees. Rather, it accentuates the ongoing call for weaker and less empowered parties to become active agents in shaping society. This understanding already highlights a crucial aspect, namely that participation is on the whole perceived as the active involvement of less empowered individuals, groups, or classes. Inherent to an understanding of participation is the transformation from a powerless position to one with an increasing capacity for action. In *culture studies* the issue of participation revolves around the question to what extent cultural production involves the active participation of consumers and citizens. In art the question of participation revolves around modes of perception and to what extent the audience is invited to participate either in the creation of a work of art or to interact with it.[60] In mass media, participation symbolizes the ability of an audience or reader to contribute and influence the apparatus of production. This discourse draws from a tradition of cultural critique

Furthermore, the term *participation rate* defines the economically active part of a population in a national economy.

60 With *Interact or Die* the Dutch Electronic Art Festival featured artworks that allegedly were stimulating interaction either with the audiences or with other electronic systems. However, most of the exhibited artworks did not fulfill the promise of interaction, but reduced the user to a "button pusher".
In 2007, the Zentrum für Medienkunst in Kalsruhe (Germany) featured an exhibition on art that deliberately invited the audience to participate entitled YOU[ser] Das Jahrhundert des Konsumenten (The century of the consumer). Here participation again was reduced to interacting to a certain extent within an pre-defined framework or script, such as selecting items from a choice of pictures, and having them printed as personally customized catalogs (Phenotypes/Limited Forms, Armin Linke, 2007), or adding pictures taken on mobile phones to a photo collage that would reorganize the collection when users interact with the installation by means of keyboard and mouse. (Sometimes Always/Sometimes Never/Sometimes, Giselle Beiguelman, 2007).
The epitome of interactive art is Jeffery Shaw's *The Legible City* (1988-1991). Visitors can sit on an actual bicycle in front of a screen and have a ride through a projected virtual city, created from letters taken from an actual street map. See aslo Anne-Marie Duguet, Heinrich Klotz, Peter Weibel. 1997. Jeffrey Shaw. A user's manual. From expanded cinema to virtual reality. Cantz: Ostfildern, pp.126-29.
Another example is Ken Goldberg's *Telegarden* (1995), a flower pot, where one can plant, water, and maintain flowers by means of a robotic device, controlled from remote locations through a web interface.

emerging along with mass media, and consists of a socio-political claim for participation, an analysis of media production and reception, as well as a general skepticism towards the owners of production means and their political representatives.[61] Socio-political critique was formulated as media critique as early as in the 1930s in the writings of Walter Benjamin and Bertolt Brecht. Calling for audience access to the production process of artworks, Benjamin literally formulates a claim for participation (Benjamin 1934/1983). It still has currency today, since Benjamin differentiates between technology and social projections and locates the task of socio-political change in the producer's ability to use and shape technology in appropriate ways. Benjamin stresses the ambivalence of technology and argues that its political effect is a matter of design. It would be crucial for any author to employ technology in a way that questions the production apparatus and enables the audience to actively participate in the process:

> What matters, therefore, is the exemplary character of production, which is able first to induce other producers to produce, and second to put an improved apparatus at their disposal. This apparatus is better the more consumers it is able to turn into producers—that is readers or spectators, into collaborators

[61] One could argue that the understanding of participation as a counter-hegemonic activity is drawn from the Frankfurt School's definition of the industry of culture as a hegemonic and regime-stabilizing force. The *Frankfurt School*, or its so-called critical theory, later continued to criticize power relations between audiences and producers. Adorno and Horkheimer's negative dialectic has often been rejected as elitist and culturally pessimist. They share this negative stance towards technological development and mass media with Günther Anders, who acknowledges the technological lifeworld as incomprehensible and unmanageable (Anders 1987), and views television as an adulterous reproduction of reality (1987:153). Mass media have been also criticized by Jürgen Habermas, who perceived them manipulating public opinion. Formulating ideal preconditions for a society-wide debate in the public sphere, he warned that mass media would not facilitate the debate but be exploited strategically for shaping it and controlling public opinion (Habermas 1990). Habermas deliberately tried to formulate an alternative to the negative dialectic and perceived the public sphere as a crucial space for critical debate and a consensus-finding processes. In the preface to the 1990 edition of his 1962 book of Der Strukturwandel der Öffentlichkeit (The Structural Transformation of the Public Sphere) Habermas revises his view of a merely consuming and manipulated audience and acknowledges their ability for critical reflection: "Die Resistenzfähigkeit und vor allem das kritische Potential eines in seinen kulturellen Gewohnheiten aus Klassenschranken hervortretenden, pluralistischen, nach innen weit differenzierten Massenpublikum habe ich seinerzeit zu pessimistisch beurteilt. Mit dem ambivalenten Durchlässigwerden der Grenzen zwischen Trivial- und Hochkultur und einer 'neuen Intimität zwischen Kultur und Politik', die ebenso zweideutig ist und Information an Unterhaltung nicht bloß assimiliert, haben sich auch die Maßstäbe der Beurteilung selber verändert" (1990:30).

(Benjamin 1983: 233).[62]

In his oft-quoted plea to use radio as a communication device, Bertolt Brecht formulated the necessity of dialog to elude the mono-directional broadcast setting (Brecht 1932/1999).[63] Brecht was expecting radio to be reconfigured into a communication device that would make a medium available for society-wide debate, and turn receivers into senders, enabling them to actively participate in political debate and decision-making.

While Benjamin and Brecht recognized in their contemporary media developments at least a possibility to participation, provided either through social regulation (Brecht) or specific appropriation (Benjamin), Theodor W. Adorno and Max Horkheimer took a dystopian stance towards media. Fled from Nazi Germany and confronted with a pervasive mass media production in their exile in the United States, they coined the term *culture industry* for the domain of intellectual labor and how it transforms all aspects of daily life. The culture industry is characterized as a homogeneous apparatus of automated, standardized, serial production for classified audiences who are controlled and manipulated with the products they consume (e.g. 1947/1987:145, 146, 159). Adorno and Horkheimer saw a basic trend towards repressive and totalitarian systems inherent to the culture industry (1947/1987:189).[64] The main characteristic of the culture industry is therefore its

[62] "Also ist maßgebend der Modellcharakter der Produktion, der andere Produzenten erstens zur Produktion anzuleiten, zweitens einen verbesserten Apparat ihnen zur Verfügung zu stellen vermag. Und zwar ist dieser Apparat um so besser, je mehr er Konsumenten der Produktion zuführt, kurz aus Lesern oder Zuschauern Mitwirkende zu machen im Stande ist" (Benjamin 2003: 243)

[63] However, Brecht's concept of *epic theater* (episches Theater) tends to be neglected in discourses on participation, although it formulates techniques that provoke the audience to distance themselves from illusion and engage actively in the "thought experiment" presented on stage. The stage served Brecht as a laboratory for examining socio-political issues, and instead of instructing the audience—as it has been common in the bourgeois theater (bürgerliches Theater) of the 18th century (Haider 1980)—Brecht aimed at a collaborative process of learning and self-education, aimed at mobilizing the audience to engage in changing the status quo (Benjamin 1971).

[64] The producers Adorno and Horkheimer were criticizing had developed strategies to limit their commercial risks. Market research, the genre and the star system, sequels and the continuous repetition of successful formats were attempts to create more standardized products for reliable audiences. The trend in media production towards limiting risks and creating products that would appeal to a broad audience was recognized as an attempt to manipulate and control individuals and create 'unnecessary' and false needs.

"Warenförmigkeit", the ability to commodify every cultural aspect for consumption and abandon all those aspects that are deemed unsuitable. The result is a totalitarian cultural regime with no possibility of participation.[65]

While the emerging participatory culture sees a great deal of production achieved by users outside the established culture industry, Adorno and Horkheimer dismissed the amateur as irrelevant. The work of amateurs or possibilities to construct cultural identities beyond the dominant structures of the culture industry were regarded as impossible or ineffective since the mass media turned "all participants into listeners and authoritatively subjects them to broadcast programs which are all exactly the same. No machinery of rejoinder has been devised, and private broadcasters are denied any freedom. They are confined to the apocryphal field of the 'amateur', and also have to accept organization from above" (Horkheimer, Adorno 1947/1987).[66] Amateur culture is here seen as an irrelevant domain, where consumer participation is limited to choosing from the available range of commodities. An alternative to the omnipresence of the culture industry was only seen in the context of complete socio-political change and the reallocation of ownership structures in media production.

The texts of Benjamin, Brecht and Adorno, and Horkheimer reveal an important issue to consider when approaching the most recent framing of participation. The programmatic texts of Walter Benjamin and Bertolt Brecht advocate inclusion through participation, aiming at engineering socio-political change through the

[65] "The culture industry as a whole has moulded men as a type unfailingly reproduced in every product. All the agents of this process, from the producer to the women's clubs, take good care that the simple reproduction of this mental state is not nuanced or extended in any way" (Adorno, Horkheimer 1944 translation by Andy Blunden, Marxist.org, <http://www.marxists.org/reference/archive/adorno/1944/culture-industry.htm>).
"Unweigerlich reproduziert jede einzelne Manifestation der Kulturindustrie die Menschen als das, wozu die ganze sie gemacht hat. Darüber, daß der Prozeß der einfachen Reproduktion des Geistes ja nicht in die erweiterte hineinführen, wachen alle seine Agenten, vom producer bis zu den Frauenvereinen." (Adorno, Horkheimer, 1947/1987:156).

[66] "Demokratisch macht dieses [Radio] alle gleichermaßen zu Hörern, um sie autoritär den unter sich gleichen Programmen und Stationen auszuliefern. Keine Apparatur der Replik hat sich entfaltet, und die privaten Sendungen werden zur Unfreiheit verhalten. Sie beschränken sich auf den Bereich der 'Amateure', die man zudem noch von oben her organisiert." (Adorno, Horkheimer, 1987:146).

adaption of technology, whereas the negative utopia of Adorno and Horkheimer precludes all possibility of participation and is profoundly suspicious of the media industry's manipulative and hegemonic character. As such, these views are part of a conflict about cultural hegemony rather than a contribution to cultural analysis.

This is also true for many texts on user participation on the Internet. Access to media production through computer technology seemed to turn audiences into active participants, able to produce their own media content or effectively comment on a wide range of corporate productions. Many commentators and scholars have embraced this development enthusiastically, recognizing the traditional claim for participation and the reconfiguration of power structures inherent in participation. Often affected by their own expectations of users as critical citizens, with an anti-hegemonic attitude, and the prospect of social change through technological development, their accounts describe media history as a continuous evolution from passive audiences and top-down organized cultural production to actively producing user communities and grassroots organization.[67] The current situation actually presents us with a dilemma. The dichotomous constellations of a repressive or emancipatory use of media (Enzensberger 1970/2003) can in fact hardly be upheld. Enzensberger 's juxtaposition of aspects indicating emancipatory or repressive media can both be found in the dispositif of Internet use: *Depoliticalization* and *political learning processes*, *passive consumer behavior* and s*ocial interaction* are as present as *collective production* and p*roduction by specialists* (Enzensberger 1970/2003:269).[68] Examples for control and repression are as recognizable as

[67] Scholarly debate in culture studies often reveals an overlap between political engagement and activism. Lovink's mapping of a critical Internet culture shows that many individuals critical of the commercialization and repression of user activities are simultaneously voicing their professional claims and activities as researchers and educators (Lovink 2003b). Many net activists, early adopters, and promoters of free access to information technology were not only enabling this claim by providing the necessary means for broader user groups in the mid-1990s, but many of them eventually flowed into the established institutions, art schools, universities, research labs, and formalized the practice of participation as a theoretical concept and socio-political claim based on a growing canon of scholarly work. I owe this insight to Kim de Vries who is investigating this transformation from activism, *self-taught expertise* (Fuller), and tacit knowledge to formalized knowledge.

[68] The decentralized organization of the Internet, the possibility of each computer to function as sender,

political emancipation. The discourse is therefore challenged to abandon the dichotomous view of media use as well as the moral appreciation of users doing something—whatever—with technology in order to analyze which different formations of technology design, use and socio-political regulation affect participation.

An important contribution in that area has been developed in media studies, and especially cultural studies, by examining the altercation between media owners and media consumers, between those who shape, commodify, and regulate intellectual labor and those who are opposed to it as consumers and powerless entities. They have pointed out the heterogeneity of media consumption (e.g. Hall 1983, Fiske 1987).[69] As opposed to a homogeneous absorption of manipulative media messages, Hall sees different ways of decoding (Hall 1983: 136). Extending Hall's Encoding/Decoding model, Fiske states that along with class, gender and race are co-producing the social difference that is affecting media reception.[70] Society is thus described as a "*complex network*"of different social groups who relate to each other according to status and power (Fiske 1992: 285). An alternative production

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the collective production and organization of communities, grassroot campaigns and critical coverage on weblogs by lays and professionals was seen as realization of an emancipatory media, but the regulation and organization of the Internet and the media practice online shows aspects of both the repressive and the emancipatory media use.

[69] A first version of Hall's model of Encoding/Decoding appeared in 1973. From a *dominant hegemonic position*, the text is received the way it was encoded by the producer and the ideology is inherently accepted and then interpreted accordingly. From an *oppositional position*, the ideology is refused as hegemonic and the text is interpreted from a contrasting mindset. Here the social and political context of the individual reader is more influential than the media text's ideological connotation. The *negotiated position* describes a reading that differentiates the various political perspectives and develops a balanced understanding (Hall 1983: 136). Hall's concept was rightly criticized for being too class determined, but still significant is his notion that the socio-political context affects media reception, so that media products can therefore not be oversimplified as an effect causing black boxes. The significance of social context for the perception of society and reality is termed *the social construction of reality* (Berger, Luckmann 1967).

[70] Fiske describes TV viewers as "active audiences" (Fiske 1987) who are producers of their personal viewing *pleasure and meaning* (1987:312). With reference to countless examples of international audiences' reception of popular American TV series, Fiske argues for a completely differential reception, often contrary to the intended encoding. Fiske's concept of an active audience is based on their ability to deconstruct the media content intellectually and construct different sets of meaning and an individual pleasure experience.

initially occurring outside the established corporate channels has been acknowledged in subcultures (e.g. Hebdige 1979),[71] as has the appropriation of the industrial production of consumer goods (Pacey 1980).[72] Amateur culture has been described as an important source of technological innovation, development, and improvement (e.g. Bijker, Hughes, Pinch 1987; Hippel 1988; Abbet 1999; Ciborra 2002; Oudshoorn, Pinch 2003).

Benjamin's text contributes to this analysis of "user" activities the important notion of a connection between a socio-political mindset and technological design, hence between technology and cultural practice. Benjamin was aware of the ambiguous character of technology. He recognized mass media production as an appropriate means for promoting socio-political change, but also noticed that the capitalist apparatus of production was able to print its own counter propaganda without being effectively harmed. He therefore advised socio-politically concerned artists to reconsider the nature of the technology they use in order to affect the overall apparatus of production. A further analysis of technology in the dispositif of participation requires an analysis of the extent to which the features of technology, the impact of the designer's socio-political mindset, and the social context have an impact, as well as the development of artifacts and how their use relate to each other. Both Benjamin and Brecht developed a concept of participation that not only

[71] Hebdige refers to punk culture as an example of establishing cultural production outside the conventional culture industry, including an independent organization of media and distribution channels, such as fanzines, concerts, record studios, booking agencies, galleries, fashion, etc. Hebdige acknowledges that societies integrate subcultures into the hegemonic culture by either criminalizing them, such as the hooligan subculture, or by commodifying them. Punk's commercial success and the fact that it conformed to Warenförmigkeit (to quote Horkheimer and Adorno) turned it into a commodity and incorporated it into the culture industry.
Punk and its independent cultural organization are best captured in the memoirs of Henry Rollins, band leader of the U.S. American punk band *Black Flag*. Henry Rollins. 1994. Get in the Van. On the Road with Black Flag. 2.13.61: Los Angeles.
Another valuable and often quoted source for alternative cultural production is Marcus Greil. 1990. Lipstick Traces. A Secret History of the 20th Century. Harvard University Press: Cambridge, MA..

[72] Arnold Pacey describes how the Inuit modified snow mobiles originally produced for winter sport activities into vehicles suitable for hunting and transportation in the polar region, and described how children in Africa reused Coca-Cola cans for building toy cars (e.g. 1983:5).

envisages consumers actively participating in production but also taking part in the shaping of technology and the reconfiguration of power structures.

Much of these hopes seem indeed to be realized thanks to increasing user participation in the digital culture. The established mass media are highly intent on challenging the uncontrolled distribution of their digital artifacts through peer-to-peer networks. However the skepticism inherent in the discourse sketched above remains valid today. In contrast to the most recent hype in amateur culture and user productivity, Adorno and Horkheimer viewed the amateur as a patronized individual with limited possibilities. With respect to large platforms for user-created content, such as *YouTube*, *Facebook*, or *Flickr*, one could state that platform providers have successfully commodified user activities by implementing them into new business models, which again raises the issue of corporate control and ownership structures (Zimmer 2008). While Adorno and Horkheimer rejected amateur activities as a meaningful contribution to a genuine people's culture, Jenkins applauds it as a new "folk culture" and Bruns, Benkler, and many others embrace it as a fundamental shift in the top-down organized cultural production of media conglomerates (Jenkins 2006b; Benkler 2006; Bruns 2008). The emergence of increasing possibilities for users to engage in social interactions and to actively produce artifacts online has lead to a plethora of publications revolving again around the question of participation.

2.1 New Media, new participation?

> Unlike traditional media, the Net is not just a spectacle for passive consumption but also a participatory activity. (Richard Barbrook 1997)

The many publications on participation emphasize clearly that consumers are increasingly accessing the apparatus of production, not only by adopting, consuming, or modifying industrial goods but also by establishing an amateur culture on a global scale, expanding their own skills and increasing their technological capital, improving opportunities for social organization, and focusing on gaining political influence (e.g. Bruns 2006; Jenkins 2002, 2006b; Leadbeater, Miller 2004; Raessens 2005, Uricchio 2004a).[73] The significant shift emerging from these accounts is that audiences are turning from interpreting to actually producing media texts. The participation of mass media audiences as examined by Hall, Fiske, and others was limited to reading media texts, and engaging with them through interpretation and deconstruction. Critiques frequently took the form of reviews, an activity that in itself was conducted in a highly professional manner.[74] But now it was possible for common users not only to produce, alter, and distribute media texts, but also develop or alter software, *the* production means of the digital age. This feature is also emphasized by Raessens, who argues that participatory culture is

[73] The actual significance of research on users, audiences, and their contribution to cultural production is evident from conferences dedicated to that topic, e.g. the *MyCreativity* conference (Amsterdam, November 2006), the *MIT Media in Transition Conference* (Boston, April 2007), the conference entitled *Medienamateure. Wie verändern Laien unsere visuelle Kultur?* at the University of Siegen (Siegen, June 2008).

[74] The diffusion of the Internet and the WWW as mainstream technologies was accompanied by a discourse of critique as well. Especially The *Nettime* mailing list and the *Next5Minutes* conference in particular formulated a critical commentary referred to as netcritique. This discourse blended with activism employing the new technologies as "tactical media". See Lovink 2003a. Hartmann perceives netcritique as a specific European approach to the US-dominated commercialization of the Internet (2000:318-21).

different from "culture participation". As opposed to taking part in a surrounding culture, participatory culture requires "a more active attitude" (Raessens 2005:383). Indeed, he points out that intellectual deconstruction is extended into action in interactive media and computer technology.[75] Instead writing a review or critique, digital cultural critics attempt to modify the program. This is the very meaning of Richard Stallman's oft-quoted slogan that software should be free, *free as in free speech* (Stallman 2002; Wynants 2005). The possibilities of reacting to media texts have multiplied. Interpretation in the digital age can be expressed in an act of construction. Deconstruction of media texts is possible through an act of construction, hence the production of new and alternative texts or the modification of existing ones. Further more, the traditional claim for participation in media production in order to participate in socio-political decision making is now formulated again, and the understanding of participation very much shaped through the practices users develop (Carpentier, Cleen 2008:3).

In view of the social interactions and productivity unfolding among computer and Internet users, the concept of participation as a promise and a critical practice returns prominently into the culture studies discourse.[76] While participation has been employed in the popular discourse as a promise for promoting new technologies, it serves in the scholarly discourse as an explanation for an emerging cultural phenomenon, and is modeled into the key metaphor for explaining the contemporary media practice. A plethora of work describing

[75] Raessens refers to critical games and to modifications of games to point out the opportunities making cultural criticism part of media content itself. An example would be *Velvet Strike* (Anne-Marie Schleiner, Joan Leandre, Brody Condon 2002), a tool for placing "graffiti" in the virtual environment of the multiplayer game Counterstrike. It is conceived as a playful form of applying critique inside the criticized environment (Schleiner 2005); see Velvet Strike at <http://www.opensorcery.net/velvet-strike/>.

[76] The term culture studies is used here as an equivalent to the German term *Kulturwissenschaft* (e.g. Kittler 2001; Böhme et al 2002). Culture studies are influenced by humanities and cultural studies and forms an interdisciplinary field between among others art history, film, theater, and media studies, and communication studies.

various kinds of *user participation* appeared over the last years, often picking up Toffler's terminology of the *prosumer* (Toffler) or coining new terms like *produser* (e.g. Bruns), *user generated content*, *DIY culture*, *peer to peer*, and enthusiastically celebrating "the former audience" (Gilmore 2006:136).[77] Dubbed by Henry Jenkins as p*articipatory culture* it formulates a concept of social interactions of users in order to produce collectively and in large scale collaboration media texts and commentary on politics and corporate media productions (Jenkins et al. 2006). Audiences do not seem to be restricted to the position of a *critical reader* anymore, but can rely on new world wide connected social structures, communication, and distribution channels, facilitated by the Internet (Jenkins2006b:246), through which they collectively can produce media texts and influence the established producers. Henry Jenkins emphasized that amateur culture is not new but due to the Internet pushed to a different scale (2002). Researching audiences of television, movies, and computer games Jenkins described their contribution in the process of production and reception as participatory culture (Jenkins 2006a). Due to the new technologies amateur culture and fan culture shifts from marginalization in the media industry to become a crucial aspect in generating and distributing media texts. Participatory culture is described by Jenkins as a *new mode* for cultural production:

> 1. With relatively low barriers to artistic expression and civic engagement
>
> 2. With strong support for creating and sharing one's creations with others
>
> 3. With some type of informal mentorship whereby what is known by the most experienced is passed along to novices
>
> 4. Where members believe that their contributions matter
>
> 5. Where members feel some degree of social connection with one another (at the least they care what other people think about what

[77] Se also: Rosen, Jay: The people formerly known as the audience [sic], online: <http://journalism.nyu.edu/pubzone/weblogs/pressthink/2006/06/27/ppl_frmr.html>.

> they have created). Not every member must contribute, but all must believe they are free to contribute when ready and that what they contribute will be appropriately valued. (Jenkins et al. 2006:7).

The first point in Jenkin's definition refers to technological aspects of the emerging media practice, the fact that production means are easily available and costs are low. The four other aspects are related to a certain social practice, which read rather like rules of conduct. Participation would be therefore limited to areas where people follow these rules as it happens in communities that are often defining directives saying how the members interact with each other. An ideological connotation is inherent to this definition, presuming participatory culture unfolds on socially 'cozy' matrix. Jenkins emphasizes the community aspects, the mutual understanding and genuine interest into each others productions, collaboration and support. Such an understanding of participation confines user activities to communities and intrinsic motivation in achieving collectively defined objectives. This understanding might be valid for the fan communities Jenkins' research draws from, but there are other user activities unfolding in the extensions of the cultural industries, that evolve around different dynamics, and do not show tight social relations, and community identity.[78]

Jenkins touches upon two important issues in his definition, namely the creation of artifacts and the distribution of knowledge among users. Participatory culture is often presented as taking place in an area of conflict. In his notion of *convergence culture* Jenkins argues that top-down approaches typical of the culture industry converge with the bottom-up activities of users (2006b:18). Jenkins refers to several examples where the activities of users collide with the business

[78] As a fan of comic books himself and a researcher examining fan communities, Jenkins has actually experienced this genuinely shared values, and the mutual interest into each others contributions. He also has experienced a blurring area between independent comic-strip artists and the industry. On conventions independent comic-strip artists are often contracted by big publishers.

interests of media companies. A supposedly critical stance on the part of users is seen the creation and distribution of media texts, and in particular satirical ones, criticizing politicians. Jenkins emphasizes the often entertaining form this takes, using methods and motives initially provided by the media industry (2006b:206).[79] The use of "photoshop for democracy", as Jenkins describes the critical media productions, is most evident in the many movie posters that have been "photoshopped" in such a way that the original icons in popular movie posters, such as James Bond, the Lord of the Rings, Harry Potter and others, are replaced with new "stars", such as members of the Bush administration as evil rogues. [80] The many forms of appropriation of corporate media texts from popular culture have supported the idea of consumers consequently turning into producers. Drawing from popular media texts, fan communities develop different modes for framing the original texts. *Slash fiction* employs characters from popular movies or TV series, such as Harry Potter or Star Trek, in erotic, often homosexual short stories (Jenkins 1992; Green, Jenkins, Jenkins 1998). Satiric Star Wars movies made by fans are another example of how media reception takes also place as the construction of new media texts. However, it should not be forgotten that this form of participation represents only a fraction of the target audience in comparison with box office sales, sold books, and merchandising sales.

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[79] An example cited by Jenkins is the anti-Bush campaign contest entitled "*Bush in 30 Seconds*". The users were invited to send in their home-made campaign movies. Six final winners were then selected by a jury (Jenkins 2006b:219); see the website <www.bushin30seconds.org> for the awarded advertisements and the jury's 150 top choices.

[80] Using image editors to change a popular motive into a picture with a somewhat political message was not only done by common users or graphic designers killing time, but also by popular magazines such as MAD Magazine, which featured a motive of the movie *Pirates of the Caribbean: Dead Man's Chest* (Gore Verbinski, USA 2006) changed into *Pirates of the Constitution: Head Man's Mess*, presenting George W. Bush, Dick Cheney, and Condolezza Rice as villains. The tagline reads: "Now Subverting a Government Near You". However, one might mention that Walter Benjamin had already noted that bourgeois media machines are able to produce proletarian propaganda aimed at undermining capitalism without affecting the capitalist system at all.

However, since Jenkins confines his research primarily to fan culture, he defines user participation as the appropriation of media content initially produced by the established production channels of the media industry. Jenkins' work, as well as that of others', provide a valuable insights into the activities of fans who employ the Internet and computer technology to accumulate material revolving around commercial media content. But this is not sufficient for analyzing all the other domains where these new media practices emerge, nor how they are, or are not, related to established culture industries. It often neglects independent productions created completely outside the realm of media corporations and their related markets. Participation doesn't only take place in relation to existing media productions, nor is it necessarily opposed or in conflict with them.

Jenkins' understanding of participation primarily deals with intrinsically motivated actions exercised in social formations which share a high degree of interaction, common objectives, and interests. It is a form of production that can be best described as *explicit*. It requires explicit action to participate in a community and consciously produce media texts and artifacts. However, new information management systems, as employed in popular Web 2.0 applications, reveal an *implicit participation*, which exists *below* the threshold of *explicit participation* and goes beyond the mere participation in a surrounding culture: social actions are channeled and controlled by design. On what one might call a rather subliminal level, users are participating—often without any form of acknowledgment from the companies offering such services—in shaping and expanding the information infrastructure. By analyzing implicit participation one can highlight the crucial role software design plays in channeling user activities on corporate platforms, and assigns agency in participation to information technology as well, rather than confining it to user activities.

Brun's concept of *produsage* (Bruns 2008) marks a step towards understanding

participation as a heterogeneous and hybrid practice. Produsage describes to what extent all participants on the different stages of online cultural production can act as users and producers. Bruns emphasizes the role of software in facilitating these collaborative processes.[81] Although Bruns puts the role of the community in the production process into perspective and rejects a collectivist thought process (2008:327), he still provides an understanding of social formation, which he calls *produsage communities*, who produce and use artifacts, and which is sometimes also referred to as *user-led content creation* (2008:3). Bruns correctly recognizes opportunities for media corporations to implement user activities in their business model, a strategy he labels "harvesting the hive".[82] The resulting socio-political dynamics are often inadequately analyzed and, instead, framed, in terms of the "good" or "bad" effects of participatory culture and the technologies it employs, i.e. the Web 2.0 applications, which are generally perceived as "social" software, in which "social" has a positive connotation, something like 'nice people are collaborating nicely with each other in order to create nice things.' A constant problem with the discourse about Web 2.0 and so-called participatory culture is the ultimately rather myopic idea that participation by many users somehow equals democracy. Biased by taking these kinds of intellectual short-cuts, the discourse becomes stymied by moral musings on participatory culture, without thoroughly examining the socio-political dynamics or the ambiguous nature of technology.

What is often embraced as something that opens up technologies for users so they can be used as genuine media practices, simultaneously makes room for new

[81] With reference to Clay Shirky he employs the term *social software* for applications which enable users to produce and share artifacts, and facilitate social interaction. Despite the fact that Bruns pays much more attention to the relation between cultural production and the socio-technical ecosystem it operates in, the ability to take action is assigned to users only.

[82] Bruns acknowledges that "it also remains possible, of course, that the continuing tendency towards harvesting the outputs of produsage communities for commercial gain, or towards hijacking the communities themselves by locking them into corporate-controlled environments, combined with stronger enforcement of commercial copyrights, will serve to fundamentally undermine participant enthusiasm for taking place in produsage projects" (2008:6). However, labeling the culture industry as a spoilsport for user communities is no substitute for the much-needed critique on the unfolding socio-political dynamics.

strategies for the culture industry. Frequent misunderstandings in the discourse on participation are the following:

a) thinking social progress is inherent to user participation

b) assuming that participation is only explicit, community-based ,and primarily intrinsically motivated

c) neglecting the fact that participating in cultural production does not mean participating in power structures or benefiting from generated revenues

d) neglecting how media practices in user participation are implemented into software design

Two crucial aspects deserve further attention in order to develop an analysis of participatory culture: firstly, the heterogeneous user activities emerging in different areas of an extended culture industry, which do not appear to be homogeneous with regard to a socio-political mindset, the motivation for participation, and forms of social organization. They are not confined to areas affected by the culture industry, but can intertwine with it in a great variety of forms. Secondly, a distinction has to be made between *implicit* and *explicit* participation, in order to understand differentiate to what extent user activities and software design affect cultural production.

Before turning to the role of technology and design in Chapter 3, the following two sections will sketch the scope of participation in the extended culture industry, and distinguish user activities according to different domains, and according to the qualitative distinction of implicit and explicit participation.

2.2 Domains of user participation

The following section attempts to structurally map the various activities of users that are often simply summarized as *user-generated content, collective production, fan culture, user-led creation, DIY culture, convergence,* and *social* 'whatever'. Labor executed by Internet users can be mapped according to the following three categories: *accumulation*, *archiving* or organizing, and *construction*. These three domains are not mutually exclusive and overlap to a certain extent. The logic of electronic distribution and the copying of files applies to all of them. As will be discussed later, recent software design for information management systems channels these user activities and proposes interfaces and functions that stimulate and regulate them.

Accumulation describes all activities that revolve around popular media content and products, for the most part initially developed by corporate companies. Fans are expanding these artifacts by contributing not only to discussions and debates, but also by creating related media texts. Jenkins' major contributions cover that field extensively (Jenkins 1992; Green, Jenkins, Jenkins 1998; Jenkins 2006a, 2006b; Jenkins et al. 2006). An example of fan culture would be the platform *Theforce.net*, a popular website for Star Wars fans, along with discussion forums, news sections, material collections on movies and a section on related events, such as conventions, fan meetings, etc, and the website also hosts a section containing fan productions. The fans do not only watch Star Wars, they produce their own versions, and some of these *Fan Films* are sophisticated productions.[83] They range from two-minute animated short clips to feature-lenght films that take advantage of a variety of editing and animation tools. Tutorials teach other enthusiasts how to create special effects, while

[83] An example for a Star Wars fan film is *The Jedi who loved me* (Henry Burrows, Adam Ahmad, Steven McCombe, UK 2000), <http://www.foiled.co.uk/tjwlm/index2.html>.

another section is used for sharing the spaceship models used in animation sequences. In *Google Idols*, Internet users mimic the *Endemol* program Idols and perform popular songs in front of their webcams (Marwick 2007). Websites like *Classicgaming.com* or *The Oldskool PC* revolve around industrial products that are not available on the market anymore, like old computers and old computer games. Using emulators, these applications can be executed on current platforms. This activity shows an overlap between accumulation and archiving by maintaining the cultural heritage and providing access to out-of-date technologies with emulators.[84] The domain of accumulation works according to the principles of 'remixing', combining, changing, and adapting texts that have been already produced. Many of these activities could be covered by *fair use rights*, but are often subject to the restricting *Digital Millennium Copyright Act* and cause "cease and desist" letters to be written. This domain thus has considerable potential for confrontations between users and copyright holding companies.[85]

Archiving/Organizing: the activity of archiving and organizing takes place on several levels. On an active and intrinsic level, users store artifacts, build archives and reorganize cultural resources and knowledge bases. Prime examples would be platforms such as *The Internet Archive*, the *Gutenberg Project*, or *Scene.org*. The latter is a platform initially used by members of the Demoscene, a culture rooted in the early computer subcultures of illegal copying and cracking of copyright protection systems, but today primarily focused on the creation of sophisticated real-time animations. Scene.org serves as the main distribution platform and archive for their productions, as well as

[84] The computer industry noticed the nostalgic need for "old school" games and recently several compilations of computer and video games from the late 1970s and early 1980s were released emulated for current platforms like Playstation, Xbox and Nintendo.
See also The Oldskool PC, <www.oldskool.org>, and Clasicc Gaming, <www.classicgaming.com>.

[85] Supported by media corporation lobbyists, the Digital Millennium Copyright Act (DMCA) has been passed by US Congress in 1998 to adapt traditional copyright to the situation of the digital age.

for the Netlabel community, which is in need of a distribution platform as well, since traffic costs can still be incurred.[86] The *Netlabel Catalogue* is a wiki-based system to documenting and organizing the multitude of netlabels according to genre and linking them to individual websites. The *Gutenberg Project* provides access to texts that are already in the public domain, as does the Internet Archive for audio, movie and text files. The original purpose of the *Internet Archive* was to save as many websites as possible over an indefinite period. Users participate by uploading files to the Internet Archive. A whole array of movie documents from conventional archives have been stored online. Another example of archiving work is the multitude of fan sites that organize links to related content or the many weblogs and web forums that share content originally produced by corporate companies. This ranges from pornography communities, mostly organized around a 'category' or 'fetish', who share related links and files to BitTorrent sites providing links to audio and movie files that are often distributed violating copyright infringement laws. Services offering web space to store large files, such as *Rapidshare*, *Flyupload*, *Bandango*, etc., are frequently used to distribute copyright-protected movie files. Communities focused on sharing pornography, in particular, use web forums to post links to online stored files. This area is often affected by copyright holder's attempts to shut sites down or have content removed. If files are removed due to copyright claims, they frequently are reposted very soon. Figure 3 indicates an overlapping area in the domains of construction and archiving that is frequently affected by copyright laws. Here the media practice of appropriating, accumulating, and distributing artifacts collides with the commercial interests of original designers and copyright holders. The affordances of new technologies, in other words, collide with business models developed in the age of

[86] Scene.org is hosted by the Erasmus University of Rotterdam (NL) storing approximately 500 GB of demoscene-related files and facilitates daily traffic of up to 200 GB: <www.scene.org>. The Internet Archive preserves screenshots of websites (the so-called Wayback Machine) and hosts books, movies, pictures that are in the public domain: <www.archive.org>.

mechanical reproduction.

Construction is production occurring outside established culture industries. It describes the emergence of new distribution and production means that are not institutionalized and not necessarily controlled by an owner, but rather generally at the user's disposal. It describes the production of new content and new technologies, as opposed to media that comment on or relate directly to popular media productions. A prime example would be software production, the *Netlabel Scene* and the *Demoscene*, contexts where production often takes place independently from corporate companies. In the field of web design, many developers collaborate in informal and non-monetary-based networks on a global scale to produce resources and production means that are exploited at a local level in so-called *creative industries*. Frameworks for building web applications such as *Django* written in the collaboratively developed programming language Python are designed under open-source principles by a community of programmers and web designers, who are actually collaborating to build the necessary tools for their daily business of programming web applications. Deeply rooted in Internet media practices, these designers are aware of the need for cooperation.

Another overlap between the culture industry and consumers has to be mentioned. In the field of modification of software-based artifacts, computer games, game consoles, hand-held devices, etc., consumer goods are exchanged by users. The *Homebrew Software scene* is developing applications for industrial devices like the *Xbox* or the *Playstation Portable*. In the field of software production, many official ties between companies and developing communities are discernible. For companies, a major advantage of users appropriating software is that the products become more useful, an aspect in which the computer game industry stimulates by providing tools for editing game levels, etc. (Nieborg 2005). It is interesting to note that the construction

of artifacts leads to the establishment of structures for archiving and distribution. For *Homebrew Software* such a platform is the download server *Xbins*, which provides hundreds of unofficial Xbox applications.[87] A popular platform for distributing open-source software is the website *Sourceforge*, which hosts over 155,000 software projects and offers an infrastructure for development, project organization, and representation.[88] Within the domain of construction, traditional copyrights and the various *copyleft licenses* and other open source and free licenses can be applied. Software is often released under copyleft licenses assuring that the knowledge and its further development remains within the cultural resource.[89] Music, demos, and other texts are often distributed under open content licenses, such as *Creative Commons* licenses, protecting fair right uses as well as the right of the copyright holder to control the exploitation and.[90] In that respect user activities don't only contribute to already existing

87 Xbins is an ftp server. Its content can be accessed on its website <www.xbins.org>.

88 Sourceforge listed 155,161 registered projects and 1,654,910 registered users on August 11th 2007, and in July 2008 182,849 registered projects and 1,902,805 registered users, plus 250,000 users registered through the Open ID project. <www.sourceforge.net>.

89 Copyleft is similar to copyright, but grants third parties the free use of intellectual labor under certain regulations, e.g. sharing derivatives drawn from the original work according to the license and making them available as original works. Open-source software is often released under copyleft licenses as the GNU General Public License, which was originally written by Richard Stallman. For an overview of the different software licenses, see Free Software Foundation: Various Licenses and comments about them, online: <http://www.gnu.org/licenses/license-list.html> and,
Lawrence Liang. 2004. *Guide to open content licenses*. Piet Zwart Institute. Rotterdam, 2004, <http://pzwart.wdka.hro.nl/mdr/research/lliang/open_content_guide/index_html/>.
Those licenses require a users to publish further developed works, or products consisting partly of works released under a copyleft license to be again released under the same license.
Other free licenses that does not require this share-alike policy cannot be labeled as copyleft. This applies for several Creative Commons licenses, many open source software licenses such as *BSD-MIT-* or *Apache* licenses. For an overview of the different open source software licenses, see Open Source Licenses, <www.opensource.org/licenses/category>

90 The Creative Commons license, which appears in different versions, was originally initiated by Lawrence Lessig, who aimed for an enforcement of fair use rights in digital culture, and is mostly used for written texts, music, photos, and movies. Creative Commons covers the traditional copyright and always requires a contribution to be made to the original creator, but provides various possibilities for adapting the original work. Users of Creative Commons licensed works can rely on their fair use rights according to the license and create derivatives, quote from the original work, or integrate it into new productions. The photo-sharing website Flickr provides a search option for Creative Commons licensed pictures. See, Creative Commons: <www.creativecommons.org>.

material, as the domain of accumulation indicates, but also create new resources, which are consequently expanded. Furthermore, user activities in the area of archiving don't only providing access to those resources, they start transforming cultural heritage through digitalization and make old resources available.

The three areas of accumulation, archiving, and construction certainly overlap, especially in light of recent developments in Web 2.0 applications, where construction and archiving are often inseparably connected. Figure 3 shows the three areas and the overlapping user activities in the extended culture industries. A more complex level of archiving and organization is the dynamic and complex interaction of a plurality of users and information technology. While users automatically engage in structuring the World Wide Web by creating hyperlinks, which affect Google search results, they can participate more actively by creating meta-data, or tags. This is information added to stored data, such as photos, hyperlinks, or articles on weblogs. The design of many recent information management systems—often recognized as typical Web 2.0 applications—stimulate users to provide these meta-data implicitly. As outlined in detail in Chapter 4.2, the design channels user actions in a way that encourages their participation in expanding the system-wide database, adding meta-data, and thereby structuring stored information semantically. Platforms for user-generated content employ these techniques for their system-wide information management system. In that respect, Web 2.0 applications create a blurring of recognized user activities, because users can accumulate, archive, and organize media content on these platforms as well as create, add, and archive their own productions. It also provides the possibility for cultural industries to shift from content creator to platform provider for user-generated content, and hence effectively extend their production mode into the sphere of consumers.

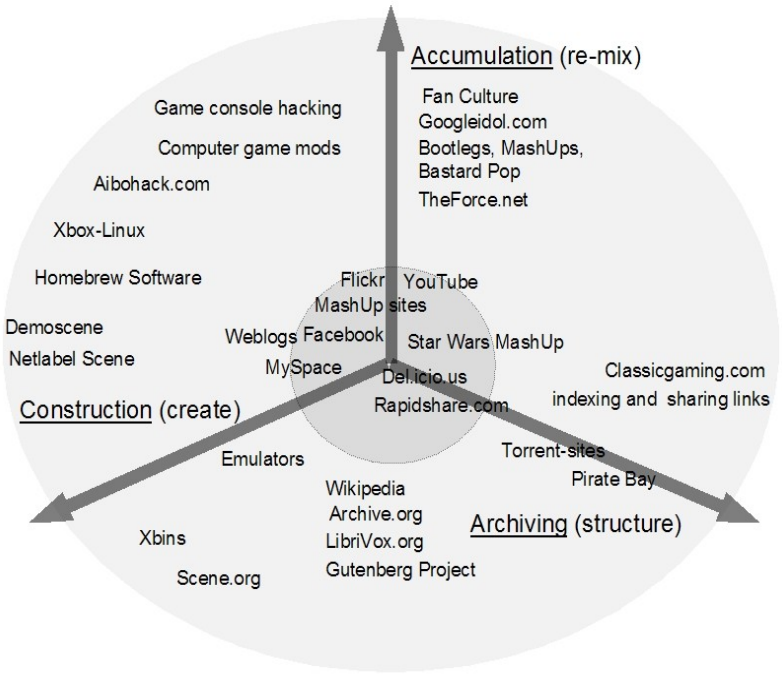

Fig. No. 3: Accumulation, Archiving, and Construction and overlaps.

As shown in Figure 3, accumulation, archiving, and construction can overlap. *YouTube* is a prime example of a platform combining all domains. YouTube provides traffic and web space for storing and distributing videos. Due to the sheer scale of traffic, YouTube itself is an industrial player, functioning as an infrastructure for users. Many of the videos revolve around popular media content or archive snippets from TV shows, such as the most embarrassing moments during the singing contest *Idols*, the *Eurovision Song Contest*, and homemade videos of those who desperately wish to appear in those shows. But YouTube is also an example for new communication channels with non unprofessional commentary about contemporary issues, the videos of which are stored on YouTube, as well as many homemade movies, the *screen casts* of

software developers who just take advantage of the free distribution system. Examples of the do-it-yourself culture are the many help and tutorial videos that provide information on how to use software or how to replace a broken *iPod* battery. *Flickr* shows how construction and archiving can completely merge and how explicit and implicit participation in cultural production interact. Users store their homemade pictures, and just by adding a title to a picture they already contribute to a system-wide database of information that shapes ways of navigating through the stored content. *MySpace* and Flickr, simply by virtue of their scale, are industrial infrastructures, used for creating personal profiles. Often these profiles refer to popular culture by featuring pop songs or references to other icons of popular culture. MySpace, like *Facebook* and *Xing* are devices for organizing and archiving nodes in individual social networks. These systems are a means for the organization and distribution of information among their users. Activities performed on the above-mentioned web platforms are often summarized as user-generated content (but not the implicit participation, which is mostly neglected) published and distributed through a platform provided by a commercial enterprise.

Participation in cultural production is evident in the domains of accumulation, archiving, and construction. Many practices of users unfold in a complex dynamic with the cultural industries; they may develop through accidental or deliberate collaborations, or in competition or completely outside of established production channels. Production outside the established cultural industries can be incorporated into the modes of production. The alleged shift from corporate cultural production to user-led production, however, is an extension of the cultural industries into the sphere of users. It also constitutes a domain for new markets and business opportunities, as well as new resources for the cultural industries' production processes. The overlapping areas of the three domains of participation can be best analyzed by distinguishing explicit and implicit participation as two different, but not mutually exclusive modes of user activities.

2.3 Explicit and implicit participation

Participatory culture is co-constituted by the material aspects of computer technology, software, and the Internet. Often these aspects have been treated as mere "black boxes" and were reduced to "enabling technologies" without further examination. Participation was therefore only recognized as *explicit participation*. It has been described as a conscious practice of competent consumers. Information management systems, however, this participation that is rather implicit and many users are not aware of their contribution. Therefore, it is necessary to distinguish between *explicit* and *implicit participation*.

Explicit participation is driven by motivation, either intrinsic or extrinsic. Reasons to participate are as diverse as the skills and abilities of those who do. Reducing these activities to critical activism, anti-hegemonic attitudes, or altruistic motives is not sufficient. Explicit participation is *heterogeneous* and concerns users who range from unskilled novices to professional programmers and come from the most diverse contexts, such as paid labor, leisure, or unpaid voluntary work, and it is heterogeneous in terms of the methods used, too.

Implicit participation is channeled by design, by means of easy-to-use interfaces, and the automation of user activity processes. In contrast to explicit participation, it does not necessarily require a conscious activity of cultural production, nor does it require users to choose from different methods in problem-solving, collaboration, and communication with others. Rather, it is a design solution that takes advantage of certain habits users have. Users are not required to interact in social networks, nor is there a need for common objectives or shared values in order to use platforms, that employ implicit participation. Such platforms provide the means for certain user activities and benefit from the user-generated content. The user activities performed on these web platforms contribute to the system-wide information management and can be exploited for different purposes, such as improving information retrieval, or

gathering user information for market research.

Implicit participation seems to emerge out of nowhere, but it is actually the result of software design that focuses on user actions. P2P file-sharing systems, such as *eDonkey*, *Gnutella*, and *Bit Torrent* reveal implicit participation in the technical design as well, since they require the user to share a part of his or her hard drive and processing power for the system-wide distribution performance. Commercial services in *Internet Protocol Television* (IPTV) like *Joost* or *Zattoo,* and *IP telecommunication* (Voice over IP, VoIP) like *Skype* or *Gizmo* also take advantage of P2P infrastructures for distribution and connectivity. Using these systems automatically leads to implicit participation in sharing hardware and connectivity for distribution purposes. Some systems, such as the above-mentioned IPTV and VoIP services, use implicit participation as a default while other P2P applications, such as the *SETI Browser* or the *Folding@home Project*, require an initial "opt in" decision to be made by the user.[91] Similarly explicit is the user's decision to participate when agreeing to share his or her files with other participants and allowing uploading to a file-sharing system. On a technical level, participation is implicit by virtue of its being part of the design, while on the user level, the conscious decision to share files and contribute to the system-wide resource of available files is explicitly constructed in the form of an agreement to share and collect files for further sharing.

[91] Users installing applications such as Skype, Joost, or Gizmo also "consciously" accept implicit participation by accepting the general terms of use.

Explicit Participation	Implicit Participation
E.g. fan culture, activism, cooperating in software development, contributing to Wikipedia and other resources, writing blogs, posting and creating content.	Uploading files to user-created content platforms, such as Flickr. Adding tags (to Flickr, del.icio.us...), using rating platforms, such as Digg.com, placing Digg buttons on a website. Rating and watching videos on YouTube.
Sharing content in P2P systems "donating" processing power to SETI, Folding@Home and others.	Default: P2P systems for distribution. Providing 'views', 'click rates' through visiting websites and retrieving content.

Fig. 4 Explicit and implicit participation

Figure 4 differentiates the various actions of explicit and implicit participation using intrinsic and extrinsic motivation as criteria for explicit participation, while implicit participation is channeled by technical design and default settings in the used systems. Participatory culture consists of both modes of participation, i.e. implicit and explicit participation. Explicit participation mostly refers to the appropriation of technology by users and the development of technical skills. Implicit participation draws on user habits, such as sharing information and sending each other copies of movies and music files. Just by watching a video on YouTube, users participate in generating data, as do users uploading files to Flickr or YouTube. Furthermore, they participate by adding titles and descriptions, as well as tags to describe their content. This data is then used to improve the system's search engine. Automating and facilitating those user activities leads to implicit participation. Thus far, this has been most effectively achieved in Web 2.0 applications, where participation is not only perceived as the possibility for users to do "whatever" they want, but also where activities are employed for improving information management, and where data is simultaneously created for marketing research and advertisement purposes, and where a variety of data is synchronized for different platforms for user-created content.

Participatory culture is closely interrelated to its technological features. The latter are inseparably related to explicit and implicit user activities and deserve attention in the analysis of contemporary media practices. Having examined the popular discourse and the scholarly discourse in the dispositif of participation, I will now focus on the aspect of technology.

2.4 Tracking technology in media practice

> So ist denn auch das Wesen der Technik ganz und gar nichts Technisches. (Martin Heidegger, 1962:5)

With reference to Heidegger, technology shapes ways of being, but the process and social context of creation already affects the cultural role technology will be playing in its use and in society (Rieder, Schäfer 2007). It has been argued that artifacts are not neutral (Friedman 1997), and human values and socio-political ideals are integrated into the design of technology and, furthermore, that the very aspects, nature, or specificity of a technology affords certain ways of use while it aggravates others. Technology therefore represents discourse and affects discourse. Design processes are also highly influenced by the socio-political discourse on technology and the expectations projected onto technological advancement. In order to understand contemporary participatory culture, attention must inevitably be focused on the relationship between human agency and material aspects. While scholars like McLuhan (1962), and more recently Kittler (1985/1995), perceived culture as highly determined by its major (media) technologies, others, such as Williams (1974), viewed culture as the way society deals with the technologies. Both points of view have to be considered since cultural practices cannot be comprehended without approaching the material aspects of its basic technologies. McLuhan's claim that a medium's content is irrelevant for analyzing its functions and effects also has to be considered, as well as Williams' call for an analysis of ownership structures and the representation of socio-political context in the medium. Even if one doesn't adopt a techno-deterministic approach, it is clear that the material aspects can avert or afford certain uses, and therefore have a profound impact on the way technology is designed and used.

Latour has pointed out that artifacts can inherit social programs that channel user activities (Latour 1991). Using the example of the heavy key fobs used in hotels before the advent of the magnetic door card, Latour demonstrated how the program "return key to reception desk" is inscribed into an artifact. The social practice of leaving the key at the front desk instead of accidentally pocketing it or even losing it somewhere has to be seen in relation to a heavy piece of metal attached to the key, making it very uncomfortable to carry along. In this case, the metal is only one of several ways to enforce house policy; the others being the grammatical imperative in "leave your keys", the polite addition of "please", the inscription of it on a sign repeating the polite verbal request upon check-in (1991:105).

The relation between practice or use and technological design is true for software, too. When speaking of participation and emerging cultural practices online, it's not only the design of software and network technologies that matters, but also their basic features. These features already influence design and use. Many phenomena in current media practices, such as the highly successful collaborative work processes in open-source software development, or the as yet unsolved challenges facing the established music and movie industries, have to be reviewed in light of the software and digital network technology features. In mapping actor-networks, technology and use will therefore be approached step-by-step as an assemblage of material features and social actions related to each other.

The past decade has witnessed many debates on how to use the Internet and computer technology and how to regulate it. The process of decision-making with regard to a society-wide and binding leitmotifs or at least a consensus of understanding of new media and their related media practices raises many political issues and reveals the discursive and society-shaping character of technology. Different objectives either ideological or mere pragmatic can be

traced as actual design solutions in computer technology, software applications and networking technologies. Again one doesn't have to adhere to a techno-deterministic point of view to realize that technology plays a hand in shaping society, as it is an amalgamation of technology and social interactions that cannot be separated at any level of development, design, or use. But it affirms that the dispositif of participation is constituted of discourses interconnected with technologies, designers and users, and that it is necessary for research to take these connections into account. In order to untangle the interrelations between material, design, and use in new media and to outline a definition of participatory culture that does not rely only on user activities, the basic technologies, computer, software, and the Internet will be examined in terms of their material aspects and how they create certain affordances for design and appropriation.

3. Enabling/averting participation

> Any sufficiently advanced technology is indistinguishable from magic.(Arthur C. Clarke)

Discussions about participatory culture often neglect the fact that they are as much about technology as they are about social interactions. Although technology is assigned an important role, many discussions insufficiently analyze the extent to which technology influences emerging media practices. Technology is perceived as somehow magically enabling users to participate in collective production, especially in the discourse on participatory culture. Perceiving technology as having appeared out of thin air leads to a moral framing of participatory culture, which results in analyses dwelling excessively on "good" or "bad" consequences. Highly informed by the positive connotation connected to community, participation, or user-led creation, technology is often reduced to the role of a neutral activator, while practice and use become the objects a myopic moral perception.[92] In order to develop a different understanding of participatory culture, the following chapter will examine key technologies, such as the computer, software, and the Internet in light of their characteristic features. Affordances of these technologies which either enable or avert participatory uses of technology are examined with respect to design decisions. Design features may have ideological connotations as well, i.e. they may be construed as a mere pragmatic solution to a given problem. As has been argued above, technology is open for interpretation, as are all media texts. Reviewing technology, which is ideologically charged in a participatory

[92] See also the comments on Bernhard Rieder's blog post about the "moral processing" of participatory culture: Moral Processing, *The Politics of Systems*, April 25 2008, <http://thepoliticsofsystems.net/2008/04/25/moral-preprocessing/>.

culture, reveals that design decisions, which were caused by pragmatic solutions, may be interpreted as ideologically motivated designs at a later stage. This often results in technology being perceived as something with an almost mythical status, which inseparably blends with the popular discourse on participation. In order to untangle this tight web of semantic connections between discourse and technology in the dispositif of participation, the key technologies will be examined in light of their design and the constituting affordances.

As Norman emphasizes, technology is affected by the qualities of the material used and the design that shapes it (1989:8). These qualities are defined as *affordances*. In his discussion on design, Norman uses the term affordance in an ambiguous way, one that constitutes a twofold understanding (Norman 1989:9). Affordance describes the material that is used to build or design something, just as wood can be used to design a table, for example, but it also describes the basic qualities of a designed object. As for the table, affordances refer to the possibility to put something on the table's surface. The use of technology is also affected by appropriation, which refers to what users do with a designer's object. A park bench is designed to be sat on, but it is often appropriated for sleeping, because its size also "affords" sufficient space to lie down on. To avert this use of park benches, designers may add extra armrests in the middle of the bench. This example also makes it clear that politics can be inscribed into the design of artifacts (see also Winner 1986; Latour 1991; Bijker, Pinch 1992). However, as Joerges convincingly demonstrates, the politics of artifacts are also subject to interpretation, and can be created by inventing a legend. [93] But as a legend it informs the discourse on technology and reveals

[93] When this argument is made, often Langdon Winner's example of the low-built Long Island overpasses are cited, indicating how architecture could execute social control. In the above-mentioned case, the lower class were denied access to Long Island beaches by public transport, because buses were not able to pass under the low bridges. Joerges convincingly shows how this argument developed a life of its own and has created a legend of racism traceable to Robert Moses' urban planning (Joerges 1999). Nevertheless, Joerges' does not argue against the concept of artifacts being political, but rather emphasizes that politics can develop its own artifacts, such as the

yet another connection between discourse and design. The many aspects contributing to the construction of technology and the development of discourse are often difficult to untangle.

With respect to the discussion in Chapter 1 about how technology unfolds as perception in popular discourse, and Chapter 2 which showed how socio-political claims in academic discourse shape an understanding of technology and its potential uses, Chapter 3 will examine the basic qualities of digital technologies in respect to design and appropriation. This is a complex matter due to the dual logic of the above-mentioned qualities. On the one hand, the basic material, which seems to be a rather fuzzy notion in a digital culture, creates affordances in addition to those created in the design of software applications.

The basic reconfiguration of our media culture is rooted in the computer, in software, and in the global interconnectedness of the Internet. It fuses technological characteristics with user practices. The constitution of media practices is very much based on the following technological characteristics:

1) the computer as a universal machine, a meta-medium;
2) software as an in-material, lossless copyable, modular and tentative resource;
3) the Internet as a global infrastructure and tool to connect to social worlds.

The computer must to be treated as the basic affordance, the platform upon which the design and use of software operates. The infrastructural features, which connect a multitude of computers to as many users, creates the potential

legend that Winner allegedly created with his "well-told story" of the Long Island overpasses. Furthermore it is important to highlight that politics in artifacts might be even more complex. In the case of the low overpasses on Long Island, they should be examined in light of whether the law prohibiting public transport in parks contributed to what was a cost effective planning scheme for the low overpasses in the first place. As such, the low overpasses might merely be the result of administrative policies that already excluded the lower classes from accessing certain areas.

for collective production, and functions as a socio-technical ecosystem for software applications and users.

3.1 The Computer

> The Analytical Engine has no pretensions whatever to originate anything. It can do whatever we know how to order it to perform. (Ada Lovelace, 1842)

> If such a machine were designed in a way that *any* owner could mold and channel its power to his own needs, then a new kind of medium would have been created: a metamedium, whose content would be a wide range of already-existing and not-yet-invented media (Alan Kay 1977:404)

Three main features of the personal computer are crucial for contemporary media practices with respect to enabling user participation: a) its ability to serve as a software environment for executing any application that is formulated in an appropriate symbolic code the computer can execute; b) its ability to copy electronic files losslessly at almost no cost; and c) its design as an everyday medium. The development of these features has to be placed in a historical perspective. It emerged from the development of binary number systems and the development of calculating machines, and was transformed through different design approaches, which are very much affected by various needs for problem-solving, as well as creating markets.

When Ada Augusta Byron King, Countess of Lovelace, described the Analytical Engine in 1842, she was formulating a concept of a universal machine, a machine able to execute any task that was requested of it in a "machine comprehensible" way.[94] The striking thing about the computers we use today is their ability to function

[94] The aspect of universality goes back to the first attempts of Leibniz to introduce a binary system for accounting (Dotzler 2006). It led eventually to the first automatic calculating machines in the 19th century. Calculating had become an increasingly important task in the 19th-century world of the British Empire and other countries facing the dynamic of the industrial age, in order to calculate pensions, mortality rates, navigation tables, etc. An overview of the 18th and 19th centuries' difference engines is provided by Williams 2003 and Lindgren 1990, who also analyzes Babbage's failure.

as universal tools, as machines that are not designed for one special purpose, but designed to execute any task provided in symbolic code. These codes are delivered as software. The personal computers made this feature of universality useful to a large group of users, and the Internet and the World Wide Web would later multiply these affordances by distributing them globally and subsequently connecting the social worlds of its many users to individual terminals. The computer functions therefore not only as a machine to execute tasks, but engages in a productive performance with its user (Winograd, Flores 1986:170).[95] The aspect of universality inherent in modern computers has been developed over time, and can be traced back not only to the personal computer, but also to the basic characteristics of the Internet. It creates a design flexibility (Winograd, Flores 1986:170) that enables dynamic productivity to occur in a participatory culture.

As an assistant to Charles Babbage, who conceived an early version of a mechanical computer, with his *Difference Engine* and his *Analytical Engine*, Lovelace recognized the potential for creation that went beyond the mere calculation of differential equations:

> The Analytical Engine weaves algebraical patterns just as the Jacquard-loom weaves flowers and leaves. Here, it seems to us, resides much more of originality than the Difference Engine can be fairly entitled to claim.[96]

This line of thought, while neglected for some time, was taken up by Alan

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[95] "The computer is like a tool, in that it is brought up for use by people engaged in some domain of action. The use of the tool shapes the potential for what those actions are and how they are conducted." (Winograd; Flores 1986:170)

[96] This notion is striking because it refers directly to the transformation from an industrial age of mechanics and steam engines to an information age of silicone chips and fiber optics. Lovelace recognizes the Analytical Engine not only as a mere difference engine for calculating equations, but as a universal device able to solve any mathematical operation which is put to the machine in an appropriate way. Among other concepts, prototypes, and finalized difference engines from that era, the Analytical Engine stands out for its universality. Ada Lovelace's notes on the Analytical Engine can be retrieved at: <http://www.fourmilab.ch/babbage/sketch.html>
Due to several problems, such as mechanics and personal failure, neither the Difference Engine nor the Analytical Engine became actual devices. However the science fiction writers Gibson and Sterling imagined the successful completion of automated information machines in the 19th century (Gibson, Sterling 1990).

Turing, who devised a concept of universal machines that became a guiding principle for the computers we use today (Turing 1936). Turing's notion of the future applications such a machine would develop is remarkable:

> The importance of the universal machine is clear. We do not need to have an infinity of different machines in doing different jobs. A single one will suffice. The engineering problem of producing various machines for various jobs is replaced by the office work of 'programming' the universal machine to do these jobs (Turing, 1948).[97]

This vision already envisions the transformation of engineering work to programming work, from countless machines to a single universal machine simulating each of the many special machines, and from the work floor of mechanical configurations and tinkering, to the office space. It anticipates programming as the main task of work processes evolving from the information machines to come. Turing's universal machine has been first and foremost a thought experiment, suggesting an infinite paper tape for storage, which eventually grew into applicable machinery through John von Neuman's electronic computer design (Bolter 1984:47).[98] The most significant feature of the *von Neumann architecture* was that it could store data and instructions in one memory and define the central components of modern computing as an input and output device, a memory and processing and control unit. A computer would then retrieve instructions from the store, read and execute them, and continue to do so until the task is completed or the program halted (Ceruzzi 2003:23).[99] The basic quality of an electronic machine, its ability to execute any

[97] Turing, Alan M. 1948. Intelligent machinery. National Physical Laboratory Report, 1948, <http://www.alanturing.net/turing_archive/archive/l/l32/L32-001.html>. See also the volume edited by the director of the Turing Archive, Jack Copeland (2004).

[98] John von Neumann published the basic principles of electronic computing in the widely distributed paper *First Draft of a Report on the EDVAC* in 1945. See Ceruzzi (1998:22).

[99] The Von Neumann architecture furthermore divides the world of computer technology into the two domains of hardware and software (Bolter 1984:49), defining the hardware as the physical components (processing unit, hard drive, motherboard, power unit, cooling devices, and peripheral devices such as keyboard, mouse and screen) on which the software is executed and represented in an interface.

task that is formulated as an algorithm, was a significant stepping stone for the further development of executable applications and the eventual development into a machine used for office work, leisure time activities, and communication. The separation of software from hardware turns the computer into a basic platform for the execution of any software compatible with the machine's operating system. It consequently turns the computer into a *software environment* (Nelson 1974/1987:47), and constitutes the emergence of software industries to provide all kinds of applications for a mass market of standardized machines (Campbell-Kelly 2003). The availability of these standardized machines at affordable prices affords access to production means and provides users with the basic platform to execute any kind of software.[100]

Another crucial aspect inherent to electronic computers is the ability to copy files. From the outset, an electronic computer was a copying machine (Parikka 2008:71). The copy is a genuine and inevitable feature of computer technology and is still the basic principle for data transmission.[101] Parikka emphasizes that the copy became a cultural technique and an aesthetic principle. This exceeds the general appreciation for collage techniques that is familiar from 20th-century avant-garde art, or of remixing in music cultures (Miller 2004), and aims at core aspects of digital culture, such as peer-to-peer file-sharing, streaming media, and unlimited access to information through downloading, and the creation and distribution of software.[102] This new media practice is contrary to

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[100] However, one should not neglect that the decreasing prices for computer hardware are also related to precarious working conditions in the manufacturing industries, especially in developing countries.

[101] The control unit fetches instructions from the memory by copying them, as well as the necessary data for executing instructions. Transferring data from one storage unit to another actually means copying them. When a user looks up a website, the actual site is copied from a web server to the user's computer where it is displayed in the web browser. Sending an e-mail is copying the text and the transmission instructions from one computer to another. Even starting a program implies the process of copying; instructions and data are copied from memory to the processing unit.

[102] The emerging meaning of the copy as endemic to contemporary culture is in Virgil Widrich's short film *Copy Shop* (Virgil Widrich, A 2001), evolving around a copy-shop clerk who gets copied himself over and over again. Countless clones of him start populating the scene. The media art work

many business models in culture industries that rely on the control of distribution, such as the music and movie industry (Parikka 2008:73). The ability to copy appears as a core feature of a computer's performance and its affordance to communicate and send data through networks.

While these two affordances (functioning as a 'universal software environment' and a 'copy machine') of computer technology are significant, the development of the computer from an expensive and sophisticated scientific apparatus to an affordable device for common users, was crucial for the emergence of participatory culture. The emergence of a market for computers and the development of an accessible device serving all kind of purposes, from office to leisure work, are closely interrelated. This process was very much affected by designing the computer as an easy-to-use medium (Friedemann 1999). The development of Graphical User Interfaces and software applications in order to make easier the programming of software and to enable users to write their own code contributed significantly to the development of the personal computers (PCs), we use today.[103]

Computers were not designed for convenience by chance; the design development of the micro computer was highly influenced by the promise of participation. Although in many texts participation has not been explicitly identified as the desired objective, many others focused on the explicit development of technologies and

Amazon Noir, The Big Book Crime (Ubermorgen.com, Alessandro Ludovico, Paolo Cirio 2006) perfectly illustrates the area of conflict between copyright, media practice, and technology appropriation; by programming a bot to send 5 to 10,000 requests per book to the Amazon search inside the book function, allegedly 3,000 complete books were downloaded from Amazon.com and then distributed through p2p networks. Eventually Amazon.com bought the software and settled litigation threats outside court. See: <http://www.amazon-noir.com/>
See also: Michael Dieter. 2007. Amazon Noir. Piracy, distribution, control, *M/C Journal*, Vol. 10, No. 5, <http://journal.media-culture.org.au/0710/07-dieter.php>.

[103] As Fickers (2007) argues the development of interfaces, such as control panels and tuning buttons, provided an effective distribution of radio to a broad audience. But along with the easy-to-use interfaces and a growing audience came regulation and control, confining the apparatus of the radio to a bureaucratically controlled broadcasting device, thus excluding enthusiast users, whose technology appropriation has stimulated inventive technological development.

machines to improve the organization of information and the understanding of knowledge. Vannevar Bush's visionary text *As We May Think* (Bush 1945) does not emphasize an enabling aspect for common users but rather sees his information machines as effective tools for professionals.[104] However, Bush's Memex, the anticipated apparatus for information management inspired other pioneers, such as Douglas Engelbart (1962) and Ted Nelson (1974), who developed tools and concepts that broadened the use of computer technology for lay users.[105] Engelbart introduces many devices that would make interaction with computers more efficient and easy, such as a pointer, the keyboard, and the mouse, the representation of users' actions on a screen. What Bush had anticipated as a research and annota-

[104] Although Bush cannot be seen as the first to propose a system of linking documents to each other semantically and storing them accordingly, his text stimulated effectively ingenuity. Recent publications show that Bush actually was the last in a row of thinkers proposing non-digital devices for organizing information (Buckland 2006, Hartmann 2006). Remarkable—but neglected pioneers—were the German chemist and engineer Emanuel Goldberg and the Belgian information scientist Paul Otlet. In 1925, Goldberg, known for his invention of microfilm, demonstrated micro photography as a means of knowledge organization at the international congress of photography in Paris (Buckland 2006). Otlet was not only among the first who exceeded archiving work for libraries from written texts to multimedia, but approached the organization of knowledge on a global scale, developing a structure of meta-information to refer to individually stored files (Hartmann 2006:220, 222). Goldberg fell into oblivion and Otlet died in 1944, badly disappointed by a world at war that seemed to have dismissed the enlightening project of worldwide knowledge organization.

[105] In his visionary account Bush conceives a tool to extend human memory, a memory extender—called the *Memex*—to organize, store, and comment on texts. He suggested making semantic connections between different texts that would organize them according to associations rather than to alpha numerical classifications (Bush 1945). He further anticipated input and output devices, search technology, and storage and organizing methods. The sketch of the entire apparatus resembled a desktop with screen and a keyboard as interfaces. But in addition to proposing a new invention, Bush more importantly seeks to promote a new mindset. As Friedemann convincingly argues, Bush was more affected by the potential role of engineers and scientists in supporting the organization of information with the invention of supportive tools (Friedemann 1999:53). His widely distributed text, which was reprinted in *Life Magazine* accompanied with pictures of the proposed apparatus, marks a step in public perception towards the information age (Hartmann 2000:304). Another important notion of the text is the anticipation of a man-machine interface for information processing and the delegation of organizing, storing, and processing information to a machine for individual use and antedates the concept of personal media for everyday use (Friedemann 1999:70). Friedemann emphasizes Bush's functional outline of an information-processing machine that contrasted with the abstract concepts of mathematicians such as Turing or Von Neumann, who brought an application-oriented engineer's approach to computer development that was unfolding in the following decades (1999:71). Although the Memex has never been built, Bush's vision of engineers making a profound difference through their ingenuity inspired many of those who are called computer pioneers today. The text "As we may think" remains important as a crucial agent of change promising unknown possibilities by supporting human intelligence and knowledge capabilities with information-processing machines.

tion tool for scientists was for Engelbart an interactive device for scientists, architects, managers, physicians, and all other occupations that deal with information (Engelbart 1962:4). In his preliminary report "Augmenting Human Intellect" Engelbart describes the computer as a medium for retrieving and sharing information, for writing, drawing and constructing models virtually:[106]

> In such a future working relationship between human problem-solver and computer 'clerk,' the capability of the computer for executing mathematical processes would be used whenever it was needed. However, the computer has many other capabilities for manipulating and displaying information that can be of significant benefit to the human in non-mathematical processes of planning, organizing, studying, etc. Every person who does his thinking with symbolized concepts (whether in the form of the English language, pictographs, formal logic, or mathematics) should be able to benefit significantly (1962:12).[107]

Engelbart's proposed future for the computer seems so natural today, but at the time it stood in striking contrast to the expectations engineers and computer scientists had for computers.[108] A general motivation for Engelbart is evident in his notion of "bootstrapping", building technologies and evaluating them immediately in order to improve them in the next design step. His design vision viewed bootstrapping as a process of technology transfer that would broaden the potential group of computer users.

While Engelbart anticipated computer technology as a means for professional use, Ted Nelson explicitly called for the computer to be turned into an enabling technology for all consumers. He argues that everybody has to understand computers, because computers would increasingly determine the shape of life in society. He furthermore anticipated so-called *hypermedia* as a means for collective

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[106] For a discussion on Engelbart's efforts to contribute to a technology transfer through bootstrapping see Bardini, Friedewald 2002.

[107] Engelbart refers extensively to Bush's concept of the Memex and places his research in association with it (1962:54).

[108] The long time Engelbart spent working alone and without significant funding attests to the marginal interest for the computer as a medium for intellectual labor (Friedemann 1999:149, 217).

production and educational processes (Nelson 1974).

Theories of learning, the quest to improve education, and enabling children were significant influences on the work of pioneering computer scientists Seymour Papert, Alan Kay, and Adele Goldberg, as well as others who pushed the development of the personal computer further (e.g. Papert 1980; Kay 1990). A radical new step in that direction was the attempt to harness computer technology for children. Recognizing the potential of computers beyond facilitating calculations in weapons engineering, they focused on designing an interactive machine for "children of all ages" (Kay 1972). Inspired by the concepts of learning taught by Jean Piaget, MIT mathematician and computer scientist Seymour Papert developed the programming language LOGO for children as users. Papert was convinced that the interactive approach to computers would have an enormous impact on learning and improve the knowledge and the thinking of children (Papert 1980). Alan Kay, who had been in contact with Papert and learned of LOGO, Piaget's theories, and the theory of constructivism, developed concepts of human-machine interaction that were directly designed for children. Kay, joining the Xerox research facility Xerox PARC in 1970, was not only influenced by contemporary learning theories, but was also familiar with McLuhan's theories (Kay 1990). Consequently, he recognized that the computer had to be perceived as a medium, and not as a tool, a machine to be operated by a specially trained person, but by anybody who grew up in a computer-related media culture (Kay 1990:1993).[109] As Kay and Goldberg put it, the computer should turn into a "meta-medium" that would make it possible to simulate all other media (1977/2003:394). This is highly reminiscent of Turing's universal machine. The resulting concept was the *Dynabook*, a computer that resembles today's laptop. For the Dynabook, Kay and Goldberg

[109] In his personal review on the development of Graphical User Interfaces Kay notes that he was wondering "What kind of thinker would you become if you grew up with an active simulator connected, not just to one point of view, but to all points of view the ages represented so they could be dynamically tried out and compared?" (Kay 1990:193).

turned to everyday actions, such as writing and painting, and tried to work them into the computer system. Similar to Engelbart's approach to translate an architect's work into a computer-aided work sphere, Kay and Goldberg conceived the Dynabook applications by translating everyday actions into computer-aided activities. Recognizing the danger of an application-overloaded device that loses its functionality in an attempt to serve every possible need, the Dynabook was conceptualized as a basic platform on which users ought to write the software they would need.[110] The important thing about this line of thought is that users in Kay and Goldberg's concept are active participants, who develop the applications they need themselves. Consequently, the computer is perceived as a platform on which basically any program can be executed. Once the basic platform (hardware) is provided, programming applications (software) provide a means for executing any medium whatsoever on the computer. Kay and Goldberg anticipated the complexity of software and its incalculable application in terms of a "not yet invented media", a blank to be filled in by the ingenuity of users of programming languages, who might build media according to their needs.[111] Future users are therefore invited to participate not only in using the technology but actively altering it through developing software applications.

Ted Nelson evangelized the use of computers as an enabling technology and as a means of education; he called for active citizen's participation, promoting connected libraries similar to Licklider's concept, but exceeding it with his idea of collaborative work processes for all users. Instead of limiting the information

[110] The object-oriented programming language *SmallTalk* developed by Alan Kay was an attempt to provide a means for programming a computer serving every possible need.

[111] The dream for a Dynabook as an active tool for children of all ages still holds large expectations for the disadvantaged generations in developing countries. Education and the promise of participation is highly evident in the One Laptop Per Child project (OLPC) headed by Nicholas Negroponte. Not surprisingly the rhetoric used in the project recalls the spirit of the late 1970s when Kay, Goldberg, Papert, and others promoted computers and programming languages as an appropriate means for children's education. Piaget's theory of learning represented in Papert's cons*tructionist learning* is literally part of the formulated vision, as Papert is on the board of directors and Kay is a member of the advisory board. See One Laptop Per Child: <http://laptop.org/vision/index.shtml>.

technologies to military people, scientists and intellectuals Nelson pleaded for free access and collective collaboration processes.[112] He formulated his vision in the ambitious publication *Computer Lib/Dream Machines*, a fanzine-like book containing xeroxed articles, clippings from papers, and many of Nelson's comments on the technological design of computers (Nelson 1974).[113] The book could be read either from the front or the back cover. The front side, Computer Lib, anticipated the computer as a comprehensible machine open for anyone to use; the flip side introduced hypermedia and hypertext as a means for education and collaborative learning.[114] Nelson's message was clear: people had to learn and understand computers now, because computers were entering all levels of society and becoming an important means for administration and governance:

> Computers are not everything, they are just an *aspect* of everything, and not to know this is computer illiteracy, a silly and dangerous ignorance (Nelson 2003:303).

A counter-cultural, anti-hegemonic tone pervades Nelson's writing, which urges the reader to recognize the need for acquiring a knowledge of computers, but it

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[112] Nelson proposed a hypertext system, called *Project Xanadu*, which never was realized on a large scale. As opposed to the succeeding hypertext system—the World Wide Web—Nelson's Project Xanadu consisted of an eternal storage system that would retain all uploaded documents and track all changes. It would further facilitate a royalty system of micro-payments, and the individual identification of all users. A rather polemic account of Nelson's "universal, democratic hypertext library that would help human life evolve" was featured in *Wired*. See Wolf, Gary, The Curse of Xanadu, *Wired Magazine*, Vol. 3.06, June 1995. For Project Xanadu, see <http://www.xanadu.net/>.

[113] Legend has it that Nelson, who had participated in the development of hypertext systems, sold the book from his trunk, because he could not find a publisher. However, it became an influential book anticipating the area of interface design and influencing many computer designers and engineers at the time (Wardrip-Fruin, Montford 2003:301).

[114] The flip side of the book, Dream Machines, explores the potential of human-machine interaction through screens and hypertext systems. Similar to Papert, Kay, and Goldberg he perceives computers as appropriate learning machines, but he emphasizes the concept of hypertext as the key factor and brings to mind Licklider's anticipated learning centers in his vision of a large library in the sky. Again, learning is perceived as the traditional process of enlightenment, but here the interaction of hypertext and computer technology was not only proposed as an effective learning process but also as means of emancipation.

is also a call to reject the computer as a mere scientific machine that cannot be used or understood by laypersons. The secret knowledge circulating in the developer's culture of computer manufacturers who thoroughly affected—in a wrong way according to Nelson—the prospected uses of computers had to be made accessible to a broader audience. Nelson calls for design to alter the machine so that it becomes a medium, and as Wardrip-Fruin and Montford point out in their commentary on *Computer Lib/Dream Machines*, Nelson foresaw intellectually what the microcomputers Altair and Apple II realized in design (Wardrip-Fruin, Montford 2003:301).

It is a convincing argument that the development of the personal computer was a complex process that took place simultaneously in different areas of scientific research that are not mutually exclusive, as well as in business-oriented research and amateur circles (Friedemann 1999; Sturgeon 2000; Freiberger, Swaine 2000; Lécuyer 2005). Visions of socio-political progress were informing the discourse and co-developing the mindset accompanying technological development. The way we understand computers has changed in the process, as they have gone from being data-processing machines to interactive devices. It radically altered the initially anticipated target group for computer technology and eventually created an enormous market, which is the point where the claim for participation meets the genuine interest of the entrepreneur, as Turner has pointed out (Turner 2006).[115] The personal computer has given users a technology that is unlike most other artifacts. In addition to its capacities of

[115] One of the first micro-computers targeted for a mass audience was released in 1977. Most attention is devoted to the Apple II, which had a superior architecture and excellent graphics. However ‚Commodore's PET (Personal Electric Transactor) was distributed with great success in Europe (Ceruzzi 1998:264). The company continued to sell successfully on the European market. The successor of the PET, the Commodore VIC 20, sold 500,000 units between 1981 and 1985, 200,000 of them in West Germany. Over four million units of the Commodore 64 were sold until 1984 and occasionally the company held a 75% market share. The contribution of Commodore, its CEO Jack Tramiel and computer designer Chuck Peddle, and the PET is somehow committed from publications on computer history. A popular account of the history of Commodore was recently provided by Brian Bagnell. 2005. On the edge: The spectacular rise and fall of Commodore. Variant Press: No place.

executing software, it unfolds unleashes creativity and effectively accumulates labor in the collaborative activities of users, who either engage explicitly in cultural production or benefit from work of fellow users when creating works individually. In the networked society, the computer is not only a 'digital workbench' but functions also as access point to networked communication and the distribution of files, and even as a multi-media center. The more graphical user interfaces made the use of software applications and networked services easier to work with, the more users were able to actively participate in the emerging digital culture. The computer apparatus forms the linchpin for the participatory culture, and will remain to do so, even when its shape changes and increasingly becomes replaced by mobile devices.

Using a computer goes beyond human-machine interaction, and in addition to the logical machinery it provides access to the realm of binary codes: software defines the infinite number of special machines and media that can be simulated on the universal machine.

3.2 Software

> The stuff we call 'software' is not like anything that human society is used to thinking about (Bruce Sterling)
>
> Mens agitat molem (Vergil, Aeneid, 6,727)

Software is the stuff that runs on computers, and it is an artifact completely unlike everything else used earlier in history. The term software primarily describes all non-physical parts of a computer.[116] The term *hardware* refers to the physical components (microprocessor, hard drive, mother board, and peripheral tools, such as the monitor, keyboard, mouse, etc.) that form the material layer for executing, storing, and representing software and data.[117] Software itself remains a rather strange phenomenon, falling somewhere in between logic and machinery. Science fiction author Bruce Sterling described it aptly:

> Software is something like a machine, and something like mathematics, and something like language, and something like thought, and art, and information... but software is not in fact any of those other things. The protean quality of software is one of the greatest sources of its fascination. It also makes software very powerful, very subtle, very unpredictable, and very risky. (Sterling 1993:31).

Indeed its very qualities affect the way software is produced, distributed, and used. It is a new strange form of language that is effective as machinery. Software is more than just a symbolic language for programming computers,

[116] For a differentiation of software into its various related aspects, such as source code, see Fuller 2008.

[117] Friedrich Kittler argues that a clear distinction between hardware and software is rather difficult to make, since software always relies on hardware and cannot be defined independently from the hardware it is supposed to operate on (1996:332). His critique discusses the inscription of program routines into hardware and the protected mode of processors as introduced by Intel. How software and hardware are intertwined becomes even more explicit in the increasing hardware requirements in software.

but intrinsically involves the "cultural practices of its employment and appropriation" (Cramer 2008:173). The quality of software as a symbolic form (often referred to as code), and as a copyable digital artifact, contributes significantly to the emergence of its cultural practice. The computer is the space where the logic of the program is converted into action. In view of software design and its appropriation participatory culture, three affordances of software have to be emphasized: software is 1) *in-material*, 2) *modular* and 3) *tentative* (Rieder, Schäfer 2007:156).[118]

Software is in-material

Software has been often perceived as immaterial, due to its close resemblance to "human language" and its haptic inconceivability. It cannot be touched physically and it is structured in a symbolic form like language, but its performance impacts the material world. However, software is always in-material, not only embedded in data carriers, but it has to be perceived in terms of materiality, because it creates productions means. Labeling software an immaterial artifact has been criticized for "trivializing and debilitating" its far-reaching and profound material impact on economics, labor practices, and social relations (Fuller 2008).[119] However, for the use of software and aspects of participation, the affordance of a language-like structure, which harbors a material inconceivability and is an affordance for any digital artifact to be distributed through copying, is a crucial aspect of software that could be called immaterial, but will be described here as in-material in order not to forget its

[118] Software certainly has more affordances, but the three affordances mentioned here appear to be the crucial ones with respect to participatory culture.

[119] Fuller argues for a materialist perception of digital media through a detailed analysis of how media systems interact and affect each other. Fuller argues that despite the increasing informational character of objects, their materiality must not be neglected; see Fuller 2005.

relation to a material world.[120]

A software program is a text written in a programming language observing a strictly defined structure and syntactic rules (Cramer 2008:168). However, software differs from spoken language in that it requires a material data carrier. On the one hand, a software program is a formulation in a programming language, while on the other hand it is the execution of the formulated actions, and it therefore stands, as Latour said, "between words and actions." Apart from the material data carrier, software requires a basic prerequisite for application; software itself is by virtue of its structure similar to language, but by virtue of its function and effect similar to machinery.[121] The metaphors we use to describe software unveil this characteristic as well, because they are drawn from the domain of both language and engineering. One speaks of *programming languages*, and the task of a programmer is to *write code*, in which *syntax errors* occur, *assembler code* is used and a *compiler* to translate the program into a language the machine can *read*. People speak of *software engineering* and the professionals are called *software engineers*, *designers*, or *architects*.[122] How close programming languages are to conventional languages becomes

[120] Toby Miller, for instance, emphasizes the emergence of a globally spread division of cultural labor equivalent to the division of labor in the industrial age (Miller 2006). This refers to the emerging critique about a new proletariat and precarious labor situation, a cybertariat (Huws 2003), as discussed recently in the mailing lists of the Institute for Distributed Creativity, or My Creative Industry (my-ci). See also the Fibreculture Journal on precarious labor, Fibreculture Journal 5, 2005, online: <http://journal.fibreculture.org/issue5/index.html>.
A discourse on creative labor and precarious conditions is emerging among the so-called creative class (Richard Florida 2002) in Europe. The Institute for Network Cultures organized a conference on MyCreativity in 2006, see the accompanying publication *The Creativity*, <http://networkcultures.org/wpmu/portal/publications/newspapers/the-creativity/>.
See also Rosalind Gill. 2007. *Technobohemians or the new cybertariat? New media work in Amsterdam a decade after the web*, Network Notebooks 01, Institute of Network Cultures: Amsterdam <http://www.networkcultures.org/_uploads/17.pdf>.

[121] Findeisen (2003:74) describes constructed languages, such as Esperanto or Volapück, as the missing link between 'human' or 'natural' languages and 'machine' languages.

[122] These metaphors were discussed in the field of software design in order to differentiate software design from software engineering. For an introduction, see Winograd 1996. The most notable early contribution to the debate was made by Mitch Kapor, who raised the issue of software design in his 1990 talk *A Software Design Manifesto* (reprinted in Winograd 1996).

clear in the programming language *Perl*, developed by Larry Wall, who was trained as a linguist. The extensive use of English words in Perl inspired developers to write Perl programs that read like poems, and though the poems may have appeared nonsensical in their context, they nevertheless represented a working program (Cox; Ward 2008:208).[123]

Perligata (or *Lingua::Romana::Perligata*) derives from Perl's translation of all English words in the programming language into Latin. When executing the program, it translates itself into the original programming language and runs accordingly.[124] These examples demonstrate how similar programming languages are related to the conventional understanding of languages in general: they are designed as languages, and function accordingly. It furthermore shows how technological design is also closely related to its developer's culture. It can be fun or sometimes nonsensical, much like conventional language use itself.[125]

Software is written in programming code, a system of characters that works according to syntactic rules, and it can be distributed like written texts, but unlike conventional texts, it can be executed by a computer reading the program code. In this process the written program code is translated into electro-magnetic impulses, which are often called zeros and the ones. Software

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[123] Perl Poetry can be found in the poetry section on the Perl community website *PerlMonks*, <http://www.perlmonks.org/>.

[124] See Damian Conway (2000); Lingua Romana Perligata, Perl for the XXI-imum Century, online: <http://www.csse.monash.edu.au/~damian/papers/HTML/Perligata.html>.

[125] An interesting phenomenon is the reverse use of language as a comment on software programming. The *Linux Kernel Swear Count* lists the number of words, such as fuck, shit, bastard, and penguin attached to lines of code in the different Linux Kernel versions, see: Linux Kernel Swear Count, <http://www.vidarholen.net/contents/wordcount/>.
The *Linux Kernel Fuck Count* notes a significant decrease in the use of the word fuck, while the commenting code with the word love increases in the version 2.2 of the Linux kernel (1999).
When the source code of Microsoft's *Windows 2000* leaked in 2004, many embarrassing comments by programmers were found in the programming code, see: Selznak: *We are morons! A quick look at the Win2k source*, in Kuro5hin, February 16 2004, <http://www.kuro5hin.org/story/2004/2/15/71552/7795>.

therefore literally exists between words (the programming language) and action (its execution):

> Now that computers exist, we are able to conceive of a text (a programming language) that is at once words and actions. How to do things with words and then turn words into things is now clear to any programmer (Latour 1992:255)

Similar to J.L. Austin's (1955/1990) concept of action through words, one could describe software as a performative artifact. In that respect, Latour emphasizes the programmer's capacity for action and the discursive aspects of technology for representing *social programs*.[126] Software programs consist of instructions for the executing computer platform but they also channel user actions. A computer program is not just a script, it is the combination of a script for actions and their performative execution that can be effective as machinery.[127] Programming means enabling action, making things and actions possible.[128] In this respect software can be described as a mode of potentiality (Winograd, Flores 1970:170-172).[129] Winograd and Flores, as well as Ciborra, argue that

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[126] In designing software, instructions are given on how to act. However, Latour points out that this is true for technology in general, which is an argument he developed in *Technology is society made durable* (1991).

[127] To enhance the discussion of enabling and averting artifacts, one could argue the opposite, namely that structures of software as well as of language not only enable but also restrict. See Judith Butler's response to the criticism that her writing is inaccessible: "It's not that I'm in favor of difficulty for difficulty's sake; it's that I think there is a lot in ordinary language and in received grammar that constrains our thinking – indeed, about what a person is, what a subject is, what sexuality is, what politics can be – and that I'm not sure we're going to be able to struggle effectively against those constraints or work within them in a productive way unless we see the ways in which grammar is both producing and constraining our sense of what the world is" (2004. 327-8). With reference to Kenneth Burke's concept of the *terministic screen,* one could also argue that software not only reflects but also deflects reality. Especially in view of interfaces, e.g. Graphical User Interfaces, it has been argued that user actions are confined and determinate (Fuller 2003b:99-120).

[128] Similar to Ada Lovelace's notion of the analytical machine that "weaves algebraical patterns", Ted Nelson speaks of programming as a "weaving of plans of events (and where they are to take place) - the choreography of happenings." (Nelson 1987:40).

[129] German philosopher Max Bense saw technology as a new modality, a combination of potentiality, reality, and necessity: "Für den geistigen Menschen der technischen Intelligenz ist die Technik eine neue, vierte Modalität neben Möglichkeit, Wirklichkeit und Notwendigkeit - es ist gewissermaßen die komplexe Modalität aus allen drei anderen." (1999:126).

designing software or information management systems in a generally flexible way, which is open to interaction, changes, and transformations through its users, will improve and work better than static, top-down designed ones (Ciborra 2002:44). A similar argument has been made in relation to users participating in design processes (Von Hippel 2005; Abbet 1999; Oudshoorn, Pinch 2003). There are many references in the literature on this subject to the Promethean aspect of software (Bolter 1986), an argument which reiterates in the debate on participatory culture technology's basic capacity to enable and emancipate. Unlike other artifacts, software can be built on a trial and error basis, as a work in progress that improves earlier steps after evaluation, at the cost only of time and not of materials. The thought experiment becomes the experiment itself in software programming. Tinkering with software is therefore generally an inexpensive but time-consuming activity in the information age, open to anybody who is willing to invest the necessary time.

The in-materiality of software emphasizes that symbolic language, action—meaning actual performance—and socio-political issues of the material world are inextricably linked. A technological constellation that enables users actually to do things with words, something they can accomplish either individually or in collaborative work processes, and furthermore to reproduce their productions at insignificant cost, constitutes a substantial shift in amateur culture. The artifact produced in software programming might be labeled as symbolic code, but it can actually execute and accomplish tasks. Software appears simply as language, but it presents technology as a cultural practice, thereby making it nearly impossible to separate technology from culture.

Since software is in-material, embedded in a data carrier, but like all other digital artifacts easy to copy and distribute, software is widely available and highly exchangeable.[130] It forms a vast cultural resource from which modules can be

[130] In the 1980s computer programs were often exchanged as a printout of all lines of code and then distributed by snail mail. Novice users would then type those programs line by line into their Atari or Commodore computers and thus enhance their knowledge of programming.

extracted for further development or to build new software applications, which leads to another crucial affordance of software, its modularity.

Software is modular

When the "programmers" of the *Typographic Age*—the scientists, philosophers, poets and artists—were writing texts, they never conjured anything out of thin air, but benefited from existing common knowledge and a reservoir of publications. In addition to the individual attributes of an author's work, the intertextuality and the abundance of cross-references and citations in discourses show how interwoven the various elements of cultural production are (Barthes 1967; Kristeva 1969; Foucault 1970). Similarly, software programmers use and contribute to a reservoir of existing written code, and they learn from other programs and even uses parts of them to integrate into new programs. As stated already, copying is an inherent element of electronic computers and digitized artifacts, as a result of which modules of other programs can be quickly and easily implemented into other programs. Programming code is not a coherent and solitary artifact, but can be divided into many different elements that can be produced separately and re-used in the most divergent programs. As with conventional texts, software builds up a reservoir, a cultural resource that is used and expanded each time programmers write and release code. It is possible because software is modular, i.e. it consists of different modules that all refer to different aspects of a given software application. Similarly, the many modules of a software program can be used for totally different programs. In this respect, software design also resembles the practice of DJ culture where modules (called samples) from various other songs are used to create new songs. The rearranging of existing artifacts is a familiar concept in 20th-century arts, from Dada to surrealism, turned into an artistic practice in Marcel

Duchamp's *ready mades*, and was especially emphasized in William Burroughs' cut-up technique, in which a finished, linear text is cut into different sections and rearranged onto new pages (Burroughs 1961).[131] These media practices, developed by an artistic vanguard, which anticipated future modes of media reception, can help to understand cultural production in the domain of accumulation, where fans rearrange media texts (Jenkins 2002; Schäfer 2004; Hughes, Lang 2006; van Dijck 2007).[132]

In software development it has been a common practice to re-use modules or even offer them in libraries that provide a framework for software development. Like building a house with LEGO bricks, developers can configure a program by assembling different building blocks of code. Educative software for programming uses this distinctive feature as well by presenting already written programs, which students can change or combine and subsequently see the result of their trial and error efforts by running the programs. Many features of software programs have already been written and just have to be integrated into the programming and adapted for the actual purpose. Programming languages and software development frameworks come with libraries that provide entire modules for certain program routines, as well as modules that enable interoperability with other programming languages.[133] The library of the open-source pro-

[131] A very pleasant account of sampling and remixing is *Rhythm Science* by Paul D. Miller, who works as a DJ under the name DJ Spooky (2004). The book is accompanied by a CD demonstrating sampling and the use of found footage. The cultural dimension of remixing as a deconstructive and intertextual process is best illustrated by his performance *Rebirth of a Nation* (Paul D. Miller aka DJ Spooky 2004). By remixing the controversial Griffith movie *Birth of a Nation* (D.W. Griffith, USA 1915) and adding a soundtrack, Miller actually revisits part of his cultural heritage, and creates a new, dispositif reception for it. To use a term from the work of Bolter and Gruisin (1999), one could argue that *Birth of a Nation* is *remediated* in the media practice of the DJ remixing culture. For an account of remixing as cultural intertwining, see Hartmann (2000:329-333).

[132] In that sense media studies has to accept software and program code as new media texts and develop hermeneutics and methods of analysis in order to provide interpretation and critique accordingly. Software cannot only used in ways similar to media texts, in its production or re-arranging, but as in texts, so is in program code ideology and dominant modes of reception inscribed.

[133] Here another analogy with music appears. Synthesizer come with many preset sounds and sound effects which are used as modules for new compositions.

gramming language *Python* offers many modules to relate Python code to other programming languages. As other script languages, such as Perl or Ruby, Python often is described as a *glue language* because it is highly capable of connecting modules from different languages and enabling interoperability between the different sections.[134]

Modularity does not only stimulate re-use, but also enables the subdivision of complex programming work in a number of sections. This way of organizing large software projects is achieved by assigning smaller pieces of programming tasks to different programmers working independently according to their skills, available time, and personal involvement, who put all the different pieces together in the end. Here, the modularity of software enables the global organization of complex software projects, creates new work processes, and makes it feasible for large groups of far-flung programmers to cooperate.[135] Modularity is clearly a crucial factor for the appropriation of software and software-based products, since in its totality the provided programming code offers ample opportunity for re-use and a host of potential combinations. In view of the cultural tradition of collage, re-use, and sampling, writing software fits snugly into the tradition of building texts that has been developed over the past century and endows software with a specific cultural value. It literally stimulates participation because it motivates the use of modules in existing software, to alter them or develop new applications. It has a significant impact on collaborative work processes, because complex software projects can be divided in many different modules of different complexity and size. Therefore a large group of developers can participate effectively even by providing only a small part of programming code. Collaboration can take place online, where platforms offer

[134] A valuable insight in the Python community is provided by Aspeli (2005) and by Findeisen (2005).

[135] That this process is anything but an easy task, even for smaller teams, is demonstrated excellently by Scott Rosenberg (2008). Rosenberg followed a group of developers over a period of three years and observed the process of developing a software application.

a means of managing, hosting, and developing collaborative software projects.[136] In view of the emerging participatory culture, the use and re-use of modules has provoked a heated debate on ownership and control (e.g. Grassmuck 2002; Gosh 2005). An urgent question is to what extent this media practice will be acknowledged and accepted in socio-political circles as a leitmotif of cultural production in digital media.

Software is tentative

While a conventional piece of engineering, say a television set, a car, or a bridge is considered finished at the end of its development and production process, software remains unfinished. It does not reach a state of completion but a state of stability and is only released once it is considered stable, and most bugs, errors in the programming work, have been removed. The development does not stop there, but continues with the addition of new features, design changes which are made when the user's appropriation interferes with the software's initial objectives. As is the case for physical artifacts, e.g. the park bench mentioned above, the use of software appropriation is revealed after the software applications are published and introduced into the market. But in contrast to physical artifacts, software-based products seem to offer a vast range of potential applications that can differ radically from the original intentions. When software-based products are released into the market they are actually merely entering another stage of development.[137] Unlike many physical

[136] The web platform Sourceforge.net, for instance, provides the means for hosting software projects. It provides users with a source code repository in order to develop code collaboratively, the possibility to present their project on a website, and the means to organize the project management and the team communication.

[137] The sequential character of software is already recognizable in the early programming process. Attempts to formalize software design in development models, like the *waterfall model*, integrated programming and debugging into the process of testing and improving.

goods, software can be updated, and electronic consumer goods with network connections receive new software updates, often without their users noticing it.[138] Increasingly, companies exploit this not only to improve the software on their products, but also to control their use. Security holes enabling appropriation are then repaired in order to avert certain ways of using the product.

Before release, software is already a process, characterized by complex design phases, and a lot of trial and error (Reeves 1992). Software is tentative in terms of its methodology, its development, and its use.[139] Despite many attempts to formalize software, software development has not evolved into a formal and structured design discipline as is the case with hardware engineering. It still remains a heterogeneous process, executed in many different ways, without mandatory or formal guidelines or standardized procedures, a process that is often the result of the very requirements software is produced for, i.e. its rather vague specifications. As software programmer Jack Reeves states:

> Software specifications tend to be fluid, and change rapidly and often, usually while the design process is still going on. Software development teams also tend to be fluid, likewise often changing in the middle of the design process. In many ways, software bears more resemblance to complex social or organic systems than to hardware. All of this makes software design a difficult and error prone process (Reeves:1991).

[138] Recent Internet applications, summarized as Web 2.0, make the aspect of permanent development visible by emphasizing their beta status in the logos, like *Mail beta* or *Plazes still beta*. *Flickr* acknowledges the extent of their beta status by adding the word *gamma* to the logo, or most recently replaced the *gamma* with *loves you*, i.e. 'Flickr loves you', to indicate the constant care and passion developers provide their applications and users with.

[139] Attempts have been introduced to implement this aspect into formal structures of software development models, such as the *waterfall model*, the *spiral model*, or iterative software development processes (Royce 1970). The continuous flow of simultaneously planning and programming, testing and debugging, is formalized in the development steps. Royce argued that programming and developing a prototype should precede testing and documenting in order to continue with the development of the actual software system under iterative connections in each programming phase, and also to maintain proper documentation (1970:3). Programming methods like *Extreme Programming* (EP) seek to involve this aspect in the way an application is programmed (Wake 2000). Often, a rough beta version is presented to the actual users who rapidly send their feedback to developers. Their feedback on the advantages, needs, and specifications is then integrated into the next step of programming.

Software therefore is in a state of permanent development. In general software is highly complex, but this complexity derives from the fact that almost no aspect of software development is independent from software design (Reeves 1992). All aspects are interrelated, not only to the programming code itself, but even more importantly to a complex and dynamic dispositif of users, machines, and graphical interfaces, aspects, in other words, that have to be translated into program routines and taken into account for the overall functioning of the program.[140] Although the practice, developed in open-source software development, of having many eyes exercise control over the code (Raymond 1998) promises increasing transparency and code maintenance, the programs, and especially their interrelations with other programs, databases, informations systems, and machines through countless interfaces, frequently continue to grow, as does their complexity. Pluralities of users interacting with software amplify the complexity and reveal "invisible hands", effects of use and appropriation on other software systems. Nevertheless, it must be acknowledged that there are areas of strict software development that result in stable products. Indeed, Rieder distinguishes between a "stabilized" and an "innovative" area of software design (2006). Automation industries developed engineering processes for software that have a more final character. The software for industrial robots, control systems of airplanes, cars, or traffic systems is characterized more by routine and stable design. Computer games, Internet and web applications, open-source software, and software for consumer products in general are more frequently subjected to still unstable parameters, experiment and innovative developments (Rieder 2006:236-237). There is still a significant amount of unexplored territory in this area of software and information systems, which leaves open the opportunity for unexpected discoveries. These often result in inventive appropriations by users that receive much attention and paint a picture

[140] Both Reeves and Kapor therefore emphasize the importance of software design, the process of conceptualizing the software in view of its future use and its users, and its compatibility with other software systems. (Kapor 1991/1996; Reeves 1992)

of software programming dominated by young, creative men, who do things that seem almost miraculous.[141]

In the area of software-based consumer goods, open-source software, and many web technologies, the range of the functionality and applicability of software and software-based products only becomes evident during the process of user appropriation. Modules of the software can be used for completely different means than intended by the programmers, and the software can reveal features none of the programmers and designers could have conceived. Another aspect is the continuously developing computer and Internet technologies that software is required to adapt to. Frequently, bugs are not anticipated and only become effective in the long-run of a software application.[142] Bugs are often used for processes of appropriation as they are a handy way for manipulating software and exploiting it for purposes unintended by the original developers.[143]

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[141] For a representation of the male hacker and inventive computer programmer, see also Herbst 2008. A similar picture was sketched of young radio amateurs in the 1920s, who were also depicted as an astonishing source of innovation in the development of radio by amateurs, see Douglas 1987.

[142] Software is never free of bugs, and their detection is often achieved only by using the software, which therefore requires beta testers and then users to find and report the errors. A practice of user participation that has been employed by the game development company *Id Software* was to publish beta version of a game (Doom) to users, who then enthusiastically played the game and reported bugs, and occasionally even provided the necessary patches. The *Mozilla Foundation* formalized bug reporting by creating an interface for users to integrate bug reporting into the Bugzilla database. Users can also make suggestions for features to be included in future versions of the Mozilla software products.

[143] Bugs in computer games are frequently used to cause an buffer overflow in a computer game console, such as *Microsoft Xbox* or *Playstation Portable*. When the system crashes due to the exploited bug a different code can be executed. This practice is used for modifying a game console to play unlicensed copies of games or install software applications different than those designated by the vendor. See the case studies in Chapter 4.1.
Another bug, recognized by accident, and is as a feature employed for so-called *trick jumping*. When aiming at the floor in a First Person Shooter and firing the gun while jumping simultaneously, the engine adds the power of the backstroke to the movement of jumping, causing a far higher movement. As a result users can reach places in a level they could never reach before and move significantly faster. An entire branch of gaming is dedicated to trick jumping.

Software is too complex for us to be able to appraise its overall effectiveness and understand the full range of its applicability. In view of its nature, Latour has noted that "even a software programmer is surprised by her creation after writing two thousand lines of software" (Latour 1999a:283). The act of creation harbors unforeseen complexities, as do the acts of use and appropriation. Latour reminds us that every creator is surprised by his or her creation, and one may add that the use or interpretation of every creation can hardly be controlled by the creator. Much like Barthes' reader, who is a co-constructor of the author's text, users participate in the creation of software by appropriating it, and reveal features not intended or made visible by the original programmers.[144] This affordance also highlights the qualitative shift from Fiske's active audiences, which were actually only active in interpreting media texts and switching between TV channels, to the users in participatory culture who actually change programs. Again similar to language, the user of digital media is not limited to interpretation or intellectual deconstruction, but engages with these new media texts by altering, re-writing, and further developing them (Raessens 2005).

The modality of software has an enabling feature in that it defines software production increasing as a cultural resource. It enables us to treat software in a similar way as other media texts, which can be remixed and combined in a variety of ways. It therefore contributes significantly to the development of software as an important practice of participatory culture. The process of learning how to use and how to develop software is and has often been a social one, which is something stressed by

[144] The program code of the computer game *Grand Theft Auto. San Andreas* (Rockstar Games 2004) consisted of a minigame, a game within a game, that allowed users to engage in erotic activities. By making this hidden feature accessible through a patch, the so called Hot Coffee Mod, Dutchman Patrick Wildenbourg caused a heated debate on the age rating of the 2004 Grand Theft Auto: San Andreas.
The practice of hiding features in a game or any other software application is often deliberately executed and referred to as an Easter Egg. In the first person shooter Doom II (iD Software 1994), an "entrance" was hidden to two levels resembling the popular iD Software game Wolfenstein 3D. Therefore, a playful hide-and-seek game exists between developers and users, which is used to explore all the functions of a software "environment".

Winograd and Flores, who say that

"the computer is unlike common tools in its connectivity to a larger network of equipment. Its power does not lie in having a single purpose, like a carpenter's plane, but in its connection to the larger network of communication" (Winograd; Flores 1986:170).

This is true of software development and its use. It transforms the cultural practice of dealing with media texts into a one with a plurality of more or less skilled users, who subsequently appropriate it in many different ways. Before the Internet, the network that provided the social 'wetware' for hardware and software were the computer subcultures, computer clubs, so-called “copy partys”, and other locally organized events. With the Internet and its extremely successful application via the WWW, computers and their users were effectively connected to a global network.

3.3 The Internet

> The emergence of a global community of learning is a natural outcome of a world in which the production and transportation of commodities finally merges with the movement of information itself. (McLuhan 2003:12)

Even if the extent of the Internet's global community remains disputable, the production of digital commodities nevertheless converges with the transferring of information online, as anticipated by McLuhan.[145] As a basic affordance, the Internet first and foremost distributes the qualities of computers and software on a global scale, making them accessible to everyone with an Internet connection. It literally connects individual computer users with a plurality of other users, regardless of their respective geographical locations. Through the Internet, a single computer is situated in a larger network that exceeds the locally confined social networks of the pre-Internet era. In addition to its usefulness as an office machine, it has developed as a convenient communication device.[146] It serves as an infrastructure for distributing data, and through accumulating resources of collectively amassed texts, it simultaniously creates an archive for cultural heritage (Borgmann 2000) and a social memory (Ernst 2007).

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[145] The Internet and the World Wide Web (WWW) represent a technology where access to stored information is just as easy as sending and receiving data. The process of sending does not distinguish between voice, text, moving images, pictures, or programming codes, as anything that is encoded in digital format can be sent and received. Transportation, communication, and accessing stored information therefore finally converge. With a computer hooked up to the Internet, the terminal becomes a sender and receiver simultaneously.

[146] Imagining computers as a communication device immediately evokes an association in any media scholar's mind with Brecht's programmatic essay of the radio as a communication device. The concept was also anticipated by Licklider and Taylor in 1968. A participatory approach is already recognizable in their choice of tool for facilitating computer networking: "Creative, interactive communication requires a plastic or moldable medium that can be modeled, a dynamic medium in which premises will flow into consequences, and above all a common medium that can be contributed to and experimented with by all" (Licklider, Taylor. 1968:22).

Describing the construction of the Internet would again highlight the dynamic and ideologically tinted interaction between humans, discourses, and technology. On a discursive level, the ideology inherent in the technology could be summarized as a) universal access and b) unlimited communication, characteristics that are most radically realized in the basic design of the World Wide Web.[147] However, many more pragmatic arguments were a driving force behind the development of networking, such as the sharing of hardware or data in research projects. Many design decisions resulting in the affordances of the Internet can be traced back to these needs and convictions. It wasn't only Licklider's dream of future libraries that had a major impact on the technical design and the social interaction of computer networks, but also the succeeding generation of engineers' belief in a free flow of information, not to mention their relatively open, non-hierarchical way of working.[148] But the need for sharing expensive computer resources, distributing information technology and win a large number of users was also influential for the development of a significant diffusion of the Internet.[149]

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[147] The dream of universal access to information as an impelling force behind the Internet and the World Wide Web has been eloquently formulated by Tim Berners-Lee: "The dream behind the Web is of a common information space in which we communicate by sharing information. Its universality is essential: the fact that a hypertext link can point to anything, be it personal, local or global, be it draft or highly polished. There was a second part of the dream, too, dependent on the Web being so generally used that it became a realistic mirror (or in fact the primary embodiment) of the ways in which we work and play and socialize. That was that once the state of our interactions was on line, we could then use computers to help us analyze it, make sense of what we are doing, where we individually fit in, and how we can better work together" (Berners-Lee, 1998).

[148] For an overview of important Internet engineers and participating designers see G. Malkin: *Who is Who in the Internet*, RFC 1336:, May 1992, <http://www.apps.ietf.org/rfc/rfc1336>, which consists of biographies of members of the Internet Architecture Board (IAB), Internet Engineering Steering Group (IESG), and the Internet Research Steering Group (IRSG).

[149] A historical account of the Internet is available in Abbet 1999, and an account focusing more on the WWW is available in Castells 2002. A popular account of the pioneers involved in the creation of the Internet is provided in Hafner, Lyon 1996; for a history of the World Wide Web see an 'autobiographical account' by Tim Berners-Lee, and Tim; Fischetti, Mark (1999), and James Gillies, and Robert Cailliau. (2000).
For a list of people involved in the early development of the World Wide Web see <http://www.w3.org/History/19921103-hypertext/hypertext/WWW/People.html>.

Unlike other information technologies and networks, the Internet and the WWW are open to a social dynamic. Their seminal success in quick global diffusion and their social acceptance are rooted in a design construction, which both accidentally and by planning constitutes a technology that does not only connect hardware and software, but also results in a performative human 'wetware': Creativity, innovative ideas, tinkering, and appropriation constituted in collaborative and individual efforts of a plurality of users. The information infrastructure is social since its development is closely linked to the social context of its participants. As Ciborra emphasizes, an infrastructure is more than just a set of hardware and software tools, but also a

> formative context [...] able to shape both the organization of work and the set of social scripts which govern the invention of alternative forms of work, the future ways of problem solving and conflict resolution, the revision of the existing institutional arrangements and the plans for their further transformation (Ciborra 2002:70).

Though already in use, both the Internet and the WWW are technologies in the making, and they are transforming themselves as much as they are transforming societies. That happens not only on the level of technological design but also on the level of social organization, as well as with regard to the interpretation of technology and its potential uses. The design decisions made during the development of the Internet and the WWW turned out to not only serve the traditional agenda of participation, but also to offer entrepreneurial business opportunities.[150]

Crucial to this aspect of social openness was the low entrance barrier and the

[150] A statement of Internet pioneer Paul Vixie emphasizes this double logic of promised freedom and entrepreneurial success inherent in the design of the Internet and the WWW: "If one of my kids, or anybody anywhere, sits down in front of a web browser and keys in a URL, it ought to just work. They ought to see the same web page that anybody else would see, no matter what country they're in or what their ISP [Internet Service Provider] wants or what their local church or government wants. This universality of naming is one of the foundations on which the Internet was built, and it is how the Internet fosters economic growth and social freedoms. It's what makes the Internet different from old Compuserve, old AOL, old MSN, old Minitel, and everything else that has come - and gone – before". Paul Vixie: Why I am participating in the ORSN Project, October 1 2005, <http://www.circleid.com/posts/why_i_am_participating_in_the_orsn_project/>.

general culture of openness that characterized the design process of both the Internet and the WWW. The traditional concept of universal access to information resources was part of that, as was the non-hierarchical collaborative efforts among its developers.[151] As Abbet emphasizes, the ARPANET was already open —although not officially—to users from outside the field of developers or computer science (1999:84). As Abbet puts it, the network provided an "environment for both frustration and opportunity for its users" (1999:90). The use was difficult and related to a number of obstacles, but the users were granted the freedom to tinker with the technology, and they were able to connect with each other for mutual support and communication. The users became a crucial aspect in developing the network and even re-defining its general purposes once the initial idea of designing a network for sharing pricey computer resources had become obsolete (1999:111). The rather informal and lax management style lowered the bar for users to actively participate and take over the initiative to contribute to the network, which Ciborra considers a crucial factor for the success of information infrastructures (2002:32).

Designing the systems applications and organizing their general regulation needs to be achieved in a way that affords participation. Similar to software and computers, the Internet and the World Wide Web evince specific aspects that co-define their social use, that stimulate certain uses and avert others. Many of

[151] The *Requests for Comments* is exemplary for the openness and collaboration of the Internet developers. These documents not only show a work process that is independent from geographical location, but they also reveal the meritocratic attitude of a developing technology. Everybody was invited to contribute to the RFCs as long as his or her contributions were interesting and supported the development process, and since they were not limited to technical issues only, they consist of philosophy, humor, and socio-political questions as well. In an RFC for the 30th anniversary of the Requests for Comments Vint Cerf reflects:
"When the RFCs were first produced, they had an almost 19th century character to them - letters exchanged in public debating the merits of various design choices for protocols in the ARPANET. As email and bulletin boards emerged from the fertile fabric of the network, the far-flung participants in this historic dialog began to make increasing use of the online medium to carry out the discussion - reducing the need for documenting the debate in the RFCs and, in some respects, leaving historians somewhat impoverished in the process. RFCs slowly became conclusions rather than debates." (RFC 2555, 7 April 1999). See RFC 2555, 7 April 1999, by Robert Braden, Joyce K. Reynolds, Steve Crocker, Vint Cerf, and Jake Feinler; online: <http://www.ietf.org/rfc/rfc2555>.

these design decision can easily be interpreted as ideologically motivated to transform the world into a better place. They constitute the legends that nourish popular discourse and promote the use of the technology to a broad audience. However, many design decisions are pragmatically chosen to stimulate a fast and effective diffusion of the technology and reach a significant number of users.[152] The competitive environment at the CERN stimulated Berners-Lee and Cailiau to deliberately design their hypertext system as a very easy-to-use tool that could be extended by anyone at low cost and without bureaucratic obstacles. In their design, they built on a resource of a number of already developed technologies. The mark-up language for creating platform-independent hypertext files, HTML, was developed from the already existing SGML and sought to become the "lingua franca" of the Web (Berners-Lee, Fischetti 1999:45). They deliberately designed the language to be easier than the standard used at CERN to encourage using the Web as a standard hypertext system. Unexpectedly, HTML was used increasingly by end-users who did not bother learning the HTML tags and started creating HTML documents. Publishing in HTML was as easy as writing a text on a text editor, as the following quote from an anonymous web post in 1995 perfectly illustrates:

```
<html>
<head>
<title>HTML is about text</title>
</head>
<body>
Publishing on the web requires text skills, not tech skills!
</body>
</html>
```

[152] Tim Berners-Lee emphasizes that the decision for an open and easy-to-use design was also caused by competitive situations at the CERN, where many scientists were working on similar hypertext systems. In order to compete, Berners-Lee and Cailliau needed a significant number of users, not only at CERN but also outside of it. (Berners-Lee, Fischetti 1999).

Later developments of HTML by editors using interfaces similar to text editors made it even easier, as did the development of web browsers, which increased the opportunities for publishing and experiencing content on the web by integrating possibilities for multimedia and graphics.

In order to stimulate the diffusion of their hypertext system, Berners-Lee and Cailliau published a website, on which the WWW was explained, and the necessary software was available as well.[153] Most of the software was released under a General Public License (GPL), allowing others to use the code, expand on it, and build applications into it. Along with this release came a call for participation. "How can I help" invited users to contribute by uploading their own data, by writing software, reporting bugs, or spreading the word.[154]

By publishing the specifications of HTML, which was now even further developed, to the Requests for Comments (RFC 1866) in 1995, and also turning it into a public standard, as well as the Web's main protocol HTTP, Dan Connolly and Berners-Lee opened the doors for further development of the technology to professional and amateur third parties, who drew inspiration from that standard to design applications and new features for the growing WWW.[155] Communicating the WWW to the people at the Internet Engineering Task Force (IETF) led to the standardization of URI/URL, HTTP, and HTML and simultaneously

[153] The first website of the WWW is archived at <http://www.w3.org/History/19921103-hypertext/hypertext/WWW/>.

[154] See, <http://www.w3.org/History/19921103-hypertext/hypertext/WWW/Helping.html>. A call for participation is attached to many collaborative work projects. Offering low barriers to participation increases the number of contributions from volunteering developers.

[155] Another standard for the WWW was a universal address syntax, which was created with the *Universal Resource Identifiers* (URI) that became known as *URLs* (Uniform Resource Locaters). It assigned universally valid, individual addresses to websites and files (RFC 1630, June 1994). Due to its universal nature the principle of hypertext, linking from one document to another, was taken to a global scale. No matter from where, a user could retrieve specific documents, and the URL was valid throughout the entire WWW and assured that every user would be able to read the same document or connect to it by placing a link to the URL in a web document (Berners-Lee, Fischetti 1999:42). Many incompatibility problems in file exchanging have been solved by it, and it became possible to connect to already existing archives, such as Telnet, FTP, and WAIS resources, and newsgroups (Krol 1992:232).

promoted the web among a critical community that stood at the forefront of technological development.[156] Berners-Lee and Cailliau benefited from a group of "early adopters" in the High Energy Physics community, especially at the Stanford Linear Accelerator Center, which set up the first web server outside CERN. Scientists had been using the Internet for years and were rather familiar with exchanging information electronically through e-mail or newsgroups (Berners-Lee, Fischetti 1999:50). Introducing the Web to the newsgroup *alt.hypertext* has been described by Berners-Lee as a "watershed event" that increased participation and collaboration exponentially (1999:51). The culture that had already developed on the Internet helped the further development of the WWW (Castells 2002:36ff). The spirit of interaction and collaboration led to the swift development of software and rules of social interaction: "The people of the Internet built the Web in true grassroots fashion" (Berners-Lee, Fischetti 1999:52).

The WWW was by far not the only hypertext system around at its time.[157] But the easy-to-use design, the availability of the software, and the unbureaucratic regulation that allowed users to participate on all levels, from publishing and browsing to actively extending the network by adding new web servers, helped the WWW to develop quickly. Another important factor is that the WWW combined two concepts of information media, by "engrafting" a hypertext system on the infrastructure of the already existing Internet. Nor was the World Wide Web the first telecommunication-based information system. *CompuServe,*

[156] The core protocol of the World Wide Web, the *Hypertext Transfer Protocol* (HTTP), was published in the RFC 1945 as version 1.0 in 1996 (further versions were published in RFC 2068 in 1997, RFC 2616 in 1999). The WWW itself was already operating on the existing infrastructure of the Internet. It benefited from an existing, globally expandable communication system by using a newly developed application protocol (HTTP) for the Internet protocol suite.

[157] At the 1991 *ACM Hypertext Conference '91* in San Antonio Berners-Lee and Cailliau were only granted a poster presentation slot. Apparently, large and expansive hypertext systems didn't seem to attract much attention. A year later the World Wide Web already counted 50 web servers. See, Robert Cailliau: *A Short History of the Web.* Keynote delivered at the launching of the European branch of the W3, November 2 1995, Paris. <http://www.netvalley.com/archives/mirrors/robert_cailliau_speech.htm>.

America Online, and the French *Minitel* system are examples for corporate and bureaucratic attempts at information infrastructures (e.g. Castells 2000:373; Ciborra 2002:39, 42; Berners-Lee, Fischetti 1999:113). Ted Nelson's *Project Xanadu* is also a noteworthy concept of a hypertext system conceived as a global infrastructure. They all failed, however, to open their systems to a broad inclusion of users. Nelson's *Project Xanadu* was designed as a "paranoid" machine storing every document and every hyperlink in an "eternal" archive and individually identifying every user. Furthermore it sketched a royalty system of micro payments to compensate any content contributor for visitors browsing its files. Commercial providers were hesitant to allow users to appropriate and expand their information system. Berners-Lee, quite on the contrary, intended to stimulate the social interaction of users to explore and develop more ways of benefiting from the new common information space. As opposed to *Minitel* or *Compuserve*, the WWW offered a decentralized approach that allowed other users and institutions to connect the most heterogeneous technical systems to the growing infrastructure. Participation for Berners-Lee was crucial because he and his small group of collaborators were not a powerful corporation but rather depended on others to make their vision work. In order to get many users on board, the designers of the World Wide Web attempted to ease use and increase compatibility of the different networks by creating a platform-independent application, instead of interfering with established practices and standards.

The public nature of such protocols, the independence from commercial vendors, as well as the possibility for anyone interested to join in and participate in the development process or at least to present their own inventions and discuss the integration of systems and compatibility, created a very fruitful atmosphere.[158] These principles envision the Internet as a common information

[158] Jon Postel, editor of the Requests for Comments and Internet pioneer, gives reasons for the successful diffusion of the Internet: "I think three factors contribute to the success of the Internet: 1) public documentation of protocols, 2) free (cheap) software for the popular machines, and 3) vendor independence" (quoted in Galloway 2005:121; and RFC 1336). Originally quoted in Jon Postel in Gary Malkin: *Who's Who in the Internet: Biographies of IAB, IESG and IRSG Members*,

infrastructure that can easily be expanded by anyone connected to the network, and grants easy access to the most necessary software for important applications, a principle Tim Berners-Lee and Robert Cailliau adopted for the World Wide Web as well. Tim Berners-Lee purposely decided not to patent the standards and offered the main technologies for free (1999:74, 76).[159] The policy stated that related programming codes used for academic purposes for free and by companies not intending to resell the code but who use it "to participate in global information exchange" would be exempt from paying a fee.[160] The openness of the main technologies and protocols of the World Wide Web represent a social program, an ideological motivation that is an inherent part of its design.

Unlike a vendor, who would only turn out to be a bottleneck to further development, use, and transformation, the Internet and later the WWW were fundamentally open to participation, allowing users to easily connect, to develop applications and services on the basis of public standards, and extend the infrastructure without the obstacle of bureaucratic procedures. In this design, the Internet and the WWW were radically different from other applications that offered similar services (Ciborra 2002:43). The Internet and its various applications provide users with the means necessary for social interaction at a global scale, and they provide an infrastructure for the distribution of digital files. Users, either professionals or amateurs, can actively engage in building and further developing many of the applications used for those activities. The Internet enables users to

RFC 1336, FYI 9, May 1992.

[159] An interesting analogy for providing innovations to the public domain in order to stimulate its wide diffusion can be found in Findeisen (2003). Findeisen dates the birth of open-source codes back to the first release of the constructed language Esperanto in 1887. Its inventor Ludwig Zamenhof declared the language as public domain. According to Findeisen this move aimed at a fast diffusion of the language in order to win many users. A differently constructed language, called Volapück, failed due to the tight control of its inventor ,J.M. Schleyer, who stifled any further development of the language by executing his copyright.

[160] See Policy of the WWW project at: http://www.w3.org/History/19921103-hypertext/hypertext/WWW/Policy.html.

do on a global scale whatever they want to do with a computer, and to connect to the multitude of other users, as well as benefiting from the growing cultural resources stored online.

4. Bastard Culture

> The street has its own uses for technology (William Gibson, Burning Chrome)

After having examined the affordances of computers, software, and the Internet, Chapter 4 will attempt to show how appropriation and design evolve in the extended culture industry. Using two sets of cases, the chapter encourages a perception of participatory culture as a heterogeneous constellation of different participants, either professionals or amateurs, whose activities are deeply intertwined. It furthermore argues for an understanding of participatory culture as a hybrid constellation of information technology and large user numbers interacting in a *socio-technical ecosystem*. A clear distinction in the resulting labor cannot be made between user and machine-created aspects, instead it has to be accepted as having been co-constructed by both. The first set of cases examines to what extent software-based products can be used in ways not anticipated by their original designers. It furthermore shows that business models can contradict the basic affordances of an artifact and provoke user appropriation to uncloak the device's extended but vendor-limited potential. These user activities qualify for explicit participation in the design process of electronic consumer goods. The second set of cases shows to what extent user activities can be integrated into software design, thereby stimulating the use of software applications, lowering the bar for participation, and creating platforms for user-created content. In this case, user activities manifest themselves implicitly as forms of participation.

Furthermore, Chapter 4 argues that participation extends production and distribution into the domain of audiences and users. As Jenkins extensively argues,

many users accumulate and modify corporate media texts. Despite the fact that user and producer blur in intertwined production processes, their specific role either as user or as producer must be defined with respect to the production process, institutional context, legal framing through licenses and copyrights, and their particular relations to companies and user communities. The case of the modification of the Microsoft *Xbox* demonstrates how users *appropriate* corporate design and to what extent the basic affordances of the Xbox have even provoked this appropriation. Ultimately, the Xbox case advocates the recognition of a second step of design development in which the corporate designers formalize many modifications and user activities to work towards a *further revision* of the design, thus benefiting technologically, and in the last instance also financially, from the input users provide. The case of the *Xbox-Linux Project* explores the work of a *heterogeneous user community*. Skilled hackers and non-skilled users participate fruitfully in a shared project and knowledge transfer is enabled through the production of tutorials and a grass-roots help service. The Xbox-Linux case is different from the XDK case with respect to motivation. The project thrived on the ongoing dispute between the Linux community and Microsoft. Furthermore, it is an exemplary case of corporate design limiting the affordances of a software-based product. The Xbox-Linux project uncloaked the suppressed potential of the video game console Xbox to turn itself into a personal computer. A *confrontation* between corporate producer and a user community is examined in the AIBO case. It demonstrates how user communities raise media attention in order to publicly claim their right of cultural freedom. The AIBO case furthermore shows to what extent companies are challenged not only by user appropriation but also by the complexity of their own products for which they fail to provide the necessary support. The majority of users participating in the mentioned projects appear to be male.

After having examined user appropriation as active participation, section 4.1 argues that user productivity is a heterogeneous process which is often closely

linked to culture industries and which often affects the design process of professional consumer goods production. User productivity therefore constitutes an extension of the culture industries rather than an alternative and separate production. Section 4.2, however, investigates implicit participation and demonstrates how user activities can be channeled and directed through graphical user interfaces and "back-end politics." It introduces the notion of participation as a hybrid process brought about by the interaction of large user groups and information systems. As opposed to the previously examined explicit participation, implicit participation often involves unacknowledged labor, or implicit, often unconsciously performed labor. These socio-technical processes are characterized by a trend towards automated user participation in order to generate data for improved information management, targeted advertising, and the maintainability of stored data. In implicit participation, the actions of user and producer do not necessarily blur, but rather those of user and information technology, because the labor is performed by both the information system and its plurality of users. Section 4.2 subsequently argues strictly against perceiving participation only as a communal activity driven by anti-industry resentment, but rather as user activities that have been developed over the past decade online, and which have now been formalized and translated into software design. Consequently, the cases explored in this section shows that the culture industry extends its business model opportunities into the domain of user activities by providing platforms for all kinds of user activities in the domains of a*ccumulation*, a*rchiving* and *construction*. Examining the relations between various participants and the aspects involved, or to use ANT terminology, human and non-human actors, reveals an actor-network that consists of technology and its basic affordances, design decisions, user appropriation, and an interrelated, often accidental collaboration of professionals and amateurs. With reference to Foucault's notion of the dispositif ,"the said and the unsaid" (legal regulations, ideological propositions, engineering and consumer culture, corporate product

definitions, and user appropriation) are part and parcel of both the technical design and appropriation. It becomes clear that the respective technologies are highly discursive since the socio-political debates on technology use, legal issues, and expectations of freedom and social progress are an inherent part of the design and appropriation.

4.1 Hacking electronic consumer goods

It is important to emphasize that modifying industrial products is not bound to digital culture, although this practice has become considerably more explicit over the past decade. Customizing and changing mass-produced serial products has always been an important aspect of amateur culture, as has been the re-use and implementation of products in different ways than initially intended by the industry (Pacey 1983). For example, the impact of amateurs on the development of radio technology has been described extensively (e.g. Douglas 1987; Lécuyer 2005); similar to the radio in the 1920s, the computer was initially targeted at hobbyists and advertised in related special-interest magazines as *Popular Electronics* and R*adio-Electronics* (Ceruzzi 2003:225).[161] The development of the personal computer itself was very much owed to the labor of enthusiastic amateurs. The significance of amateurs in developing hardware and software continued after the commercial introduction of the first microcomputers in the early 1980s. It often took place in computer subcultures, and communities of hobbyists, who started to write their own software and exchange it through fanzine-like computer magazines. Another example of software appropriation are gamers creating their own levels, so called *mods*, or further developing a game. The prime example for successful modifications is probably the first shooter game, *Counterstrike, which* was modified from the commercial game *Half Life*.[162] In gaming, producers of commercial games recognized how valuable user contribution was, and as a result they are

[161] Lécuyer draws a direct line from the radio amateurs of the 1920s to the computer hobbyists in the 1970s by demonstrating how their technological knowledge shaped the economical development in the San Francisco Bay area and especially Silicon Valley (Lécuyer 2005).

[162] *Half Life* was developed by Valve Software and published by Sierra Studios and Electronic Arts in 1998. A main motivation for modification was to create a multi-player mode. Initially developed by two university students, Jeff Cliffe and Minh Le, the game benefited from a large community at Planet Half Life at Gamespy <http://planethalflife.gamespy.com/>. *Counterstrike* illustrates perfectly how industry and user appropriation can intertwine. Both Minh Le and Jeff Cliffe joined Valve Software and *Counterstrike* was officially released in 2000.

adopting ways of integrating the communities' work into their production processes with increasing frequency (Nieborg 2005). The hands-on activities in the Xbox-Linux project, the production of modified chips as well as the Xbox homebrew software scene in general, are almost exclusively the domain of male hackers.[163] This is still the case for many areas of digital culture, as for instance in the demoscene and the netlabel scene, or in groups dedicated to the development of open source software.[164] However, initiatives such as the *Gender-changers*, the German group *Haecksen* attempt to provide space and capacities for women teaching women to use, alter and modify software, as well as hardware.[165] Another area showing a higher but not yet balanced percentage of female participation in hardware hacking and software modification is media art.[166] Although but a few areas have been identified where user appropriation occurs explicitly as female agency, such as in the so-called slash fiction (e.g.

[163] Self-acclaimed Web-flâneur Karen Eliot vents her anger about male dominance tellingly by asking "Do I need a dick to participate in participatory culture?"; See Karen Eliot: *Searching the XX in Geekdom*. Internet Business, February 2 2008, <http://www.internetisseriousbusiness.com/>

[164] In a talk at Barcamp Rotterdam, Femke Snelting from the Belgian organization Constant <www.constantvzw.org> emphasized that male dominance in 'alternative' software development communities, which embrace open source software, is even more visible than in the corporate structures for developing proprietary software. Snelting pointed out that the sector of open source software development is gender-biased in terms of a majority of male participants, and the existence of a mindset affected very much by gender essentialism. The lively discussion following her talk in order to seek explanations for this phenomenon and the related problems only confirmed her point and revealed a noteworthy amount of arguments merely based on an anachronistic gender essentialism. Barcamp Rotterdam, November 9 2007.

[165] The Genderchangers organize the Eclectic Tech Carnival, an annul festival for women interested in technology, <www.genderchangers.org>.
The Heacksen are an association of the female members of the German hacker collective Computer Chaos Club, <www.haecksen.org>.
The Old Boys Network <www.obn.org> is a collective of 'cyberfeminists' founded in 1997.
More recently the initiative of Girl Geek Dinner regularly invites woman speakers and provides possibilities for women (and men) to meet. Girl geek dinners are organized in various cities, e.g. Amsterdam, <www.girlgeekdinner.nl>.

[166] Cornelia Sollfrank's art project *Female Extension* (1997) approaches the unbalance of male and female artists by generating virtual female artists and production, as well as generating individual art works for each fake artist. Those productions were sent to the first netart exhibition at the prestigious art museum Hamburger Kunsthalle, which did not notice the fake and initially released a press statement that more than two thirds of the contributing net-artists are women.
<http://artwarez.org/femext/index.html>.

Jenkins 1997, Kustritz 2003), the promise for a participatory culture—so often formulated as a universal principle—is challenged by the absence or the lack of representation of women actively appropriating hardware and developing software (see also Keif, Faulkner 2003).[167] However, the scope of this research cannot appropriately analyze its case examples with respect to gender relations.[168]

In general any consumer good is open for appropriation (Akrich 1998). However, modifying software seems to be pervasive, since tinkering with software can take place in online connected communities supporting each other and distributing software at almost no costs. Appropriating software does not require certain craft skills and special tools, but a computer and time to learn to work with software. Furthermore, it is possible to formalize the hack of a software or software-based product in an application or hardware device in order to distribute it widely and make it easy to use for lay users. In appropriating electronic consumer goods the craft of hardware modification and programming are often combined, extending substantially the range of functionalities of the products in question.

High-school students even use mods for their scientific calculators, and parents find information online telling them how to remove the region code on their DVD players. For hand-held game consoles like *Playstation Portable* (PSP) and *Nintendo DS,* a plethora of websites dedicated to hacking and *homebrew*

[167] Most recently Claudia Herbst analyzed the representation of the female hacker in popular movies and compared it to the role of women is software development (2008). Game researcher Tanja Sihvonen analyzed the role of women in the appropriation of computer games, in particular in modifying of The Sims (2009).

[168] For an account of feminist concerns with regard to women's access to computer education and the effects of computers on womens' lives, see Ruth Perry and Lisa Greber 1990. Paul Edwards provides an historical analysis of gender issues embedded into computer technology and its use (1990). For an analysis of gender relations and a discussion of gender equity in technology use, see Cynthia Carter Ching et al. (2000), Alan Bain et al. (1999). An analysis of Internet use with focus on information research from a gender perspective is provided by Annbritt Enochsson (2005).

software have inundated the Internet.[169] Although game copying is a major motivation for using and installing homebrew software, the developing community also offers many more attractive features which are not covered by the actual producers. The Nintendo DS can turn into an organizer, and serves as a music and video player as well.[170] Furthermore, a list of modifications would also include the *Roomba Community*, which uses the reasonably priced artificial intelligence technology of the homonymous robot vacuum cleaner to tinker with,[171] the *iPod Linux* project that migrated a Linux distribution to the popular music player,[172] and the so-called *case modders* who change their computer cases and compete for the coolest, most imaginative and eccentric case, most often accompanied with high-performance graphic cards and tuned processors —*overclocking*—and water cooling systems, or techniques to decrease the machine's noise level, called *silent modding*. Modifications therefore also take place at the level of the hardware itself, by replacing or changing the original parts. A second level of modification affects the software, a practice which is very common in gaming but also among electronic consumer goods, which consist of hardware and software. For the original Xbox, even commercial modifications have entered the market; the Taiwan-based company *Friend Tech* changed the original device by adding a much faster processor, a bigger hard

[169] The term homebrew software refers to software that was not programmed by a regular company but by members of user communities. Very active platforms for homebrew software are PSP Hacks, <www.psp-hacks.com/> PSP-Scene, <http://pspscene.net/forums/>, for the Playstation Portable, and DS-Scene, <www.ds-scene.net/>, for the Nintendo DS.

[170] Executing software such as *DS Organize* or *Moonshell* on a Nintendo DS requires a modchip, such as the *R4* card from which an alternative operating system is booted and which allows executing other codes approved by Nintendod. This card replaces the original operating system. It enables users not only to play unlicensed copies of games, but also to run software developed within the homebrew scene. Those applications range from file browsers to organize stored content, over media players (such as Moonshell) to web browsers, e-mail clients, picture viewers, text readers, homebrew games, emulated games from different gaming platforms. DS Organize is a software suite consisting of calendar, e-mail client, web browser, and a file browser.

[171] Roomba hacks on Roombareview.com: <http://www.roombareview.com/hack/>; the Roomba wiki: <http://roomba.pbwiki.com/>; the Roomba Community: <http://www.roombacommunity.com/>.

[172] Ipod Linux: <http://ipodlinux.org/Main_Page>.

drive and a case that resembled the style of *case mods*.

Many web shops for computer games and game console accessories offer modified consoles as well. Production and distribution of modchips actually constitute a shadow market that is severely contested by established companies in the field (see Chapter 5). It shows that user appropriation can also be commercially motivated. The ambiguous crossover and interrelatedness of professionally working hackers developing modchips, user communities, non-monetary-driven projects, and corporate companies reveals participation as a complex interleaved. Those connections are revealed, when relations and connections of the various participants and the different elements involved in the process of appropriation are mapped, as will be described in the following example cases. On this macro-level methods provided by actor-network theory prove to offer a valuable insights into the actual dynamics of user activities and the crucial role of technological design. However, such a research is limited in several ways: It is not possible to identify all actors or to sufficiently follow them. One is confined to a certain extent to the 'willingness' of participants to communicate. It was almost impossible to receive statements from companies, not to mention actual interviews with corporate designers or decision makers. People from the hacker scene, maintainers of user forums or other expert users were often very open and helpful in providing information as well as in describing their activities in detail.[173]

On the macro-level of hands-on user appropriation it provides more insight and information to describe constellations between users, technology and corporate companies as an actor-network. However, the research attempts to relate

[173] Interviews have been conducted by students of the Department for Media and Culture Studies at Utrecht University who participated in a research group on the appropriation of game consoles. Over a span of almost two years the project focused on the homebrew software scene and user communities related to the gaming devices Playstation 2, Playstation 3, Xbox, Xbox 360, Playstation Portable, and the Nintendo DS.
Results have been presented at the CRESC Conference in Oxford 2006 (Schäfer 2006b).

various aspects to the overarching discourse and its ideological connotations.

The Trail of the XDK

When developing the *Xbox*, Microsoft provided a software development kit, called *Xbox Development Kit* (XDK) so third-party developers could create applicable software for the video game console. The use of the XDK was strictly regulated through a licensing policy and only companies that had obtained a license were allowed to produce and market software for the Xbox. The XDK, however leaked onto the hacker and homebrew developer scene, who also started to produce software for the Xbox, software not approved by Microsoft. The case of the XDK will reveal connections between Microsoft and the hacker scene and show how hackers and common users collaborated in the production and distribution of applications. It also shows how the leaking of the XDK into the community of hackers created an alternative network of users who produce and distribute homemade software applications and establishe entirely alternative gaming networks. A relationship to professional companies participating in the modification of the Microsoft game console is visible as well. However, the most recent *Xbox 360* is an example of how a commercial vendor can learn from user appropriation, and consequently develop a design to avert certain forms of appropriation and deliberately implement others.

In 2001 the Microsoft corporation entered the market of game consoles by introducing the Xbox, targeted to compete directly with Sony's successful and top-selling *Playstation 2*. Shortly after launching the console, Microsoft released *Xbox Live,* a gaming network offering various services and online multi-player games. Technically, the Xbox was actually a regular personal computer limited to the functions of a game console. It came with an Intel Celeron 733 MHz processor, 64 MB of RAM, an 8 or 10 GB hard disk, a DVD drive, and a

network interface. A stripped-down version of the Windows 2000 kernel served as its operating system. As pointed out in Chapter 3, a computer is an all-purpose device, a universal machine, confining these basic affordances to a "special machine", a video game console, for replaying corporate content, contradicts the technical possibilities. It could not have come as a surprise that users would immediately try to unleash the full potential of the Xbox. The Xbox processor would only run vendor-licensed software, whereas software developed with unlicensed XDKs required a modification of the Xbox.

The producer's definition of the Xbox as a game console resulted in a discrepancy with its technical specifications. After being released into the market, the contradictory design attracted the attention of hackers and enthusiasts who recognized its capability to perform a broader range of functions.[174] The inconsistency between the product's definition and its actual technical capabilities on the one hand and the collective intelligence of users on the other turned out to be a motor for cultural production. The Xbox became one of the most popular platforms for cracked software and so-called *homebrew software*.[175] The appropriation of the actual Xbox design is revealed in the process of hacking and the many applications developed for modified game consoles.[176]

A variety of motives drive the labor for hacking a game console. As Linux enthu-

[174] MIT student Andrew "bunnie" Huang was probably the first to hack the Xbox. He initially posted some documentation of his hacks to his website and published a memo on the cryptosystem of the Xbox (2002). See also Takahashi (2006:56-59).

[175] As will explained later in this chapter, homebrew software for the Xbox is produced using the official Microsoft Xbox Development Kit (XDK). In opposite to software produced by Microsoft's licensed third party developers, homebrew software consists of unlicensed code, and is therefore not approved. An original Xbox is not able to execute such programming code, and therefore needs to be modified.. A wide choice of software for hacked Xboxes is programmed and distributed within these communities.

[176] Other game consoles, the Sony *Playstation 2* and the Nintendo *Gamecube*, did not stimulate a noteworthy production of homebrew software. In interviews, game console hackers mentioned that the Xbox was relatively easy to hack, and one of its advantages was the hard drive and the PC-like technology, but social aspects should not be overlooked either. The Xbox attracted a group of users that were forming a community and accepting the challenge of hacking the device for various reasons.

siasts, the members of the *Xbox-Linux Project* were seeking ways to migrate Linux even on the Microsoft Xbox and turn it into a full-fledged PC. Other hackers thought of extending the possibilities of the console and developed extra software for features Microsoft had not supplied it with. The most popular application was probably the *Xbox Media Center* (XBMC).[177] This is a media player that runs most video and audio formats and turns the Xbox from a game console into an entertainment centre for movies, video clips, music, and of course games. It supports the archiving of media files on the Xbox's hard drive. Other developers provide games or emulate those from outdated platforms for the Microsoft game console. However, playing unlicensed copies of games remained and continues to be a main motivation for hacking game consoles.

Producing and using *homebrew* software requires several extra features that open up an entire set of producers, users, hardware, and network effects beyond the original production channels of the Xbox. The leaking of XDK into the homebrew developers' scene reveals an entire alternative actor-network of video game console use. To produce software for a hardware platform, a proprietary toolkit of hardware and software is needed. The XDK could be considered a 'transparent' version of the black box Xbox, and was officially only available to licensed third-party developers. In respect to the black box metaphor it is amusing and noteworthy that the developer's kit was provided in a transparent case, in opposite to the black case of the retail version of the Xbox.[178]

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[177] Xbox Media Center, <http://xbmc.org/>.

[178] For the Playstation, Sony released the development kit *Net Yaroze*, which any user can purchase. Due to various specifications, Playstation 2 never became a comparably popular platform as the Xbox. A problem might have been the community aspect, that there was not enough challenge involved in hacking the Playstation, which would have been necessary to draw individuals into to share this interest and build a community. Playstation attracted a group of Linux coders which claims to have more than 20,000 users: Playstation 2 Linux Community, <http://playstation2-linux.com/>.

Fig. 5, Xbox, developer kit (transparent), consumer kit (black)
Image by courtesy of Ian Court <www.ianc.net>

The XDK provides the necessary production necessary means for developing any software for the Xbox. It consists of a software development environment and pre-installed libraries for programming routines. After being available to the user communities, the XDK made it possible to program homebrew software for the Xbox. Software developed by Microsoft's official third-party developers and those applications labelled as homebrew, in other words, are built with the very same means of production but differ in their *signed* or *unsigned code*.[179] Signed code could only be executed on the Xbox processor, which made it necessary to modify the console either by installing a so-called *modchip* or modifying it through a software manipulation in order to run unsigned code. Modification chips are small electronic devices that will be attached to a printed circuit board of e.g. an Xbox.[180]

[179] Since all files on Xbins are produced without licensed XDKs, the code is unsigned and remains vulnerable to copyright infringement claims. Commercial distribution is therefore out of the question. In order to work around the limitations of unsigned code produced with the unlicensed XDK, a group of developers is building an open-source equivalent. However, the *Open XDK* does not offer the possibilities of the proprietary version and does not represent an alternative for developers yet. In fact, it represents an attempt to clone the production means Microsoft provided with the XDK but controls its output due to intellectual property laws. Open XDK is hosted at Sourceforge: <http://sourceforge.net/projects/openxdk/>.

[180] The modchip consists of a modified version of the original devices' BIOS. When booting the game

The modchip or the modification appears as a crucial actor that circumvents the proprietary control of executing signed code only. It furthermore transforms the vendor-controlled console into a user-appropriated and-user controlled device, running software which is not intended or approved by the original designers. There are two ways of modifying a game console, the so-called *hard mod* and the *soft mod*. In case of the hard mod, the original processor is replaced by a so-called *modchip*, consisting of an alternative operating system that will execute all code. Modchips were developed and produced mostly by European hackers who employed encryption techniques to protect their work from Asian based enterprises cloning their design and selling it for a cheaper price. Companies such as *Lik Sang*, *Friend Tech,* and countless webshops in Europe and the US distributed the modchips for all kinds of gaming consoles.[181] These companies were often targets of lawsuits filed by Microsoft, Sony, and Nintendo, who argued that modchips are primarily used for playing copied games. An entire gray market emerged due to the demand of modchips, which are sold by web shops in large quantities.[182] In order to produce a working alternative chip, the modchip producer needs profound knowledge of the specifications of the targeted product, knowledge that is acquired by reverse engineering of the device.[183] Although their production and distribution is sometimes illegal, and usually ambiguous, modchips are produced on an

console or any other device with a modchip, the modificated chip injects its BIOS into the system so that the original version will not be executed. The modified operating system hten allows software to execute that would not be approved by the original version. In response to that practice vendors made online updates for the devices firmware necessary. Replacing the original version through a modchip became therefore an insufficient practice.

[181] Lik Sang a Hong Kong based outlet, operated by the Austrian Alex Kampl, became the target of copyright infringement claims and had to shut down its service.

[182] See Chapter 5, section 5.1 for a description of the confrontation between modchip producers and game console companies.

[183] Developing a modchip is not a simple amateur activity. It requires knowledge and funding for research and development in order to produce a prototype that meets the requirements and is not easy to clone. For serial production, financial resources are necessary to purchase the technical components. According to a former SmartXX member pre-production can cost up to $50,000.

industrial scale and answer the user's desire to do different things with gaming devices than the vendors intended. Both the producers of consoles and games feel their business model is being threatened by modchips because their revenues are based on selling games and additional services to the often subsidized hardware of the game consoles.[184]

Using a soft mod does not require opening the game console or touching the original hardware, but circumvents its control mechanisms and allows the execution of all code as well. When softmodding the Xbox became a common and easy thing to achieve, Microsoft reacted by declining warranty claims and excluding modified consoles from the *Xbox Live!* network. In response, user communities developed their own alternative networks like *Xlink Kai* to exploit Local Area Network (LAN) technology and relay the gaming from the console via a desktop computer over the Internet to an alternative network. It even allows compatibility between Xbox, Playstation, Nintendo, and hand-held consoles such as Playstation Portable.

It is not quite clear how the XDK came into the hands of hackers. In interviews, homebrew software developers and members of user communities often speak of the "XDK leaking into the community". There are many hints of unofficial relations between corporations and hackers, a recent one being linked to an incident in 2005, when stolen development kits for the next generation console Xbox 360 were found in the house of the Austrian hacker *Hamtitampti*, a member of the modchip producer *SmartXX*. In a statement he denied the accusation of having stolen the development kits but admits that SmartXX got hold of them and had notified Microsoft right after. According to Hamtitampti, whose house was raided by the police, Microsoft tried everything to avoid a public law suit, attempting to withdraw the initial complaint of theft, and even

[184] The problem of the game console business is the subsidized hardware, which is sold below its actual price. The revenues are generated by selling games and peripheral devices, like a remote control for the Xbox and game controllers, as well as online services which were specially introduced for the next generation consoles Xbox 360 and Playstation 3.

paying his lawyer.[185] So, if the leaking of the XDK to the user communities was indeed something that Microsoft was aware of, this would complicate the actor-network even more, with the corporate actor using the users while pretending to oppose their activities.[186]

In any event, the leaking of the proprietary knowledge in the form of the XDK can be traced to the many homebrew applications that were developed with it. By far the biggest platform for the distribution of these applications is the ftp server *Xbins*.[187] Figure 6 shows a screen shot of the folders stored on the ftp server Xbins as of October 2005; it reveals the vast amount of applications provided there.

[185] "Zur Seite von Microsoft möchte ich nur sagen: Klar, ihr werdet sicher wieder alles dementieren, wie immer. Aber unter der Hand auf der X05 jedem Reporter zu erzählen, dass der Täter schon gefunden ist …… Ist jedenfalls toll, auch weil in der internen Anweisung auf bezug auf den fall „Stillschweigen" ausgerufen wurde. Dann dementiert mal, warum Ihr meinen Rechtsanwalt bezahlt? Bankbelege kann man schwer abstreiten oder handelt es sich hierbei möglicherweise um gefälschte unterlagen?" Source: <http://www.smartxx.com/forum/thread.php?threadid=4808> (June 2007). "To Microsoft I'd like to say: Sure, you're going to deny everything again, as always. But to tell every journalist at X05 that you've already found the perpetrators… that's amazing, since in the internal memo [at Microsoft] everyone was asked to keep quiet about it. Why don't you deny that you're paying my lawyer? It's going to be hard to explain my bank statements, or are these possibly falsified documents?" <http://www.xb360info.com/xbox/news/168> (June 2007).

[186] Companies such as the German Prevent AG operate as private investigators to collect evidence against people committing copyright infringement. The Prevent AG was involved in the leaked Xbox 360 development kits, but made also media headlines by their engagement in finding the *Sasser Worm* author. However, many of those connections remain undisclosed and more often rumors and speculations haunt the scene. One of the unverified speculations is the rumor of modchip producers buying illegally intellectual property from a Microsoft employee.

[187] Xbins website: <www.xbins.org>.

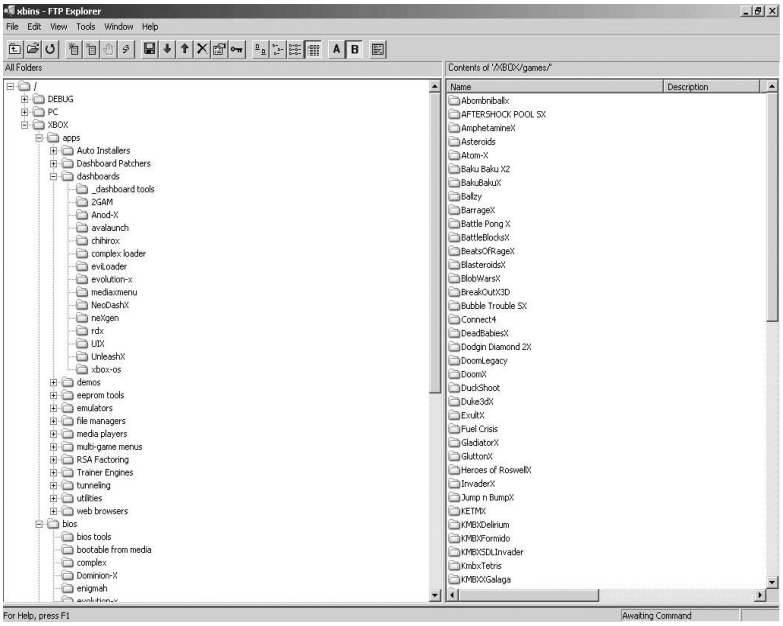

Fig. 6, Screenshot of files hosted at Xbins ftp server

For each access to download files from Xbins, users have to get a password and a log-in name from a channel in the *Internet Relay Chat* (IRC).[188] The maintainers of Xbins emphasize that they are not supporting so-called *warez*, illegally copied and distributed games, but only homebrew software, meaning unsigned code that is produced with the XDK. When retrieving a password and a log-in, users receive a note that the server contains only homebrew software, and that each user will be allowed to download 30 files only, because "We do NOT tolerate GREED and you shall be banned if you break this rule" (see screenshot, fig. 7).

[188] The Internet Relay Chat is a popular communication channel for hackers, software developers, and members of the game console communities to debate, organize software development, and exchange information.

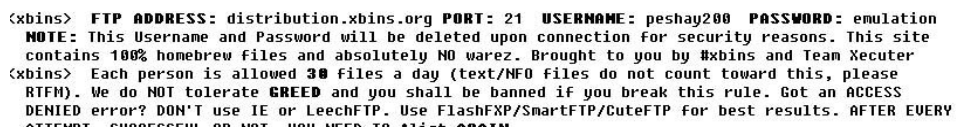

Fig. 7, snippet from Xbins dialouge for log-in and password retrieval

For users with less ftp-server experience, many files are distributed through the popular open-source platform Sourceforge.net or through file-sharing systems, such as Bit-Torrent. The file-sharing programs are also used for distributing copyright-protected software and games. Distribution of software therefore primarily occurrs via three channels: a) ftp servers like Xbins, b) websites, like Sourceforge.net, and c) P2P file-sharing systems.

The widespread unlicensed use of the official Microsoft XDK reveals unacknowledged ties between Microsoft and/or their licensed third-party developers with the homebrew scene. Since XDK found its way to software developers outside the established software and games industry, it is evident that hacker and homebrew developers form just another group of third-party developers.[189] Members of homebrew development communities suggest such leaks should take place more frequently so that software could be developed in a quicker and better way. With XDK, Microsoft offered a device for developing applications for the Xbox to professional software providers, but when it leaked into the hacker community, the chain of development extended to another network. Indeed, it has reached the hacker and user communities, who use the same tools as professional producers. They extended the production of the Xbox by

[189] As Hamtitampti from SmartXX points out : "Not only the XDK leaked: It is a mystery inside the hacker scene until today how it was possible, that a 4GB source code tree (including the complete Xbox kernel) and test applications had leaked into the Internet. Some modchip operating systems, like *Xecuter*, were completely built out of this source." Further more this code consisted of proprietary code of DVD player producer STMicrosystems for the DVD player firmware. The complete DVD player code and everything needed for making the DVD-Dongle (for playing copied games) including the DVD menu became available for hackers and other DVD player producers.

introducing new functions, developing new interfaces, and redefining the original device. These are not only activities performed by hackers, nor are they, as often alleged, a counter-action against the proprietary and commercial producer, but they are closely linked to the playfulness of hacking, as well as to commercial interests. The motivations for appropriating an electronic consumer good are as diverse as the developed applications. Here, an entire branch of software production is emerging independently from the official third-party developers for the game consoles. A market for providing hardware and services to run unsigned code as well as copied games on official products is emerging along with the homebrew communities. Their relation to user communities is evident on the websites of the game console scene.

The most popular online platforms for game console users are *Xbox-scene.org*, *Gamespot*, *Kotaku.com*, etc. These websites are crucial for communication and presenting news to the user community. They serve as a virtual drop-in center where new users, so-called *newbies*, can find information and support. Forum discussions treat all kinds of elements related to game consoles. Hacking is a topic, as is the possible features of unreleased hardware and software. Discussions revolve around gaming, *exploits*, *cheats,* and ways to work through different games. These websites also contribute to the media hype generated before the release of new game consoles, and in the case of the Xbox 360 and Playstation 3, discussions about the performance of processor and graphic cards, and of course debates about the hackability and possibilities of software development through the community are rampant. Online magazines and special-interest magazines covering news about information technology, computers, and gaming are creating attention too. Important hacks are covered there, and developments regarding legal issues about modchip production are being carefully monitored.[190]

[190] A website like Xbins.org serves as a web catalog for the contents of the eponymous ftp server, while Xbox-scene.org is important for promoting homebrew software applications and hacker groups. Modchip producers and companies distributing the modchips and computer, game supply, and

Community websites are a crucial aspect in the actor-network of game console hacking. They serve as portals and platforms for the various groups connected to game consoles: hacker and development groups, modchip producers and their distributors, producer of graphic card and other hardware suited for gaming, weblogs about gaming, mainstream and special interest media, and the actual game console producers, whose official websites are often linked to the community sites. Figure 8 shows the hyperlink clusters of the community website Xbox-scene.com. The network shows connections between the official Xbox.com website, the user community Xbox-scene.com, as well as to the modding scene, represdented, for instance in the websites TeamXodeus.com, SmartXX.com, or the distribution platform DMS3.com. Links are also visible to the Xbins.org website, which provides most of the homebrew applications, but also supplies the Playstation Linux community, the official Xbox website, and several hacker groups, as well as modchip distributors. Figure 9 maps the actor-network in the XDK case. The figure describes step one of the design and appropriation cycles that the Xbox has undergone so far. It is clear that the leaking of the XDK created an entire additional set of producers, users, applications, media appearances, and a set of relations that connect hackers with modchip producers, who are related to distributors, who again advertise on community websites. It has to be acknowledged that both the officially released and the leaked XDK turns third-party developers, as well as hackers, into users of production means developed by Microsoft. This software giant controls the output by licensing policies which designates one code as rightful, while it relegates the others to the fringes of legality.

modified game consoles often place advertisement banners on user community websites and link to them from their own websites. Advertisement banners of the official game console producers can also be found on community websites. Friend Tech promoted the book *Hacking the Black Box* from hacker Andrew "bunnie" Huang. The modchip producer SmartXX links with a banner to the website of the Xbox-Linux Project. Sometimes hyperlinks represent social connections as well. In the case of SmartXX and the Xbox-Linux Project, some members participate in both projects.

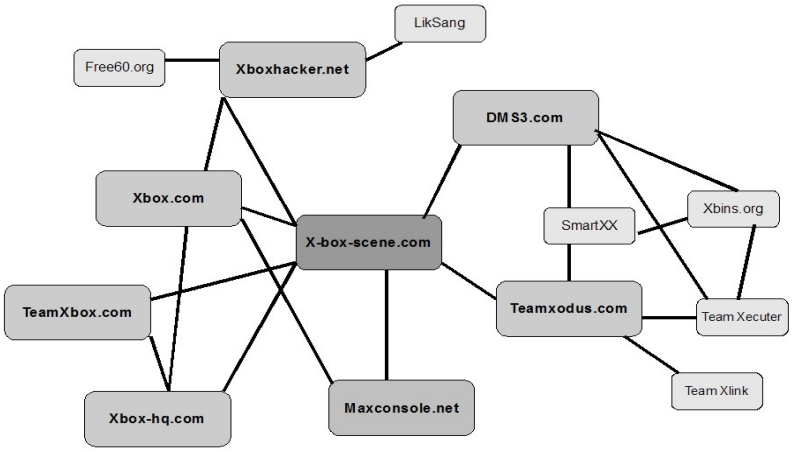

Fig. 8, User community Xbox-scene.com, selected links.

Licensing fees can compensate for the subsidized hardware that does not earn profits. User appropriation redefined and changed Xbox into a media center and computer bypassing the built-in limitations and copyright protection systems. When Microsoft started to control the execution of unsigned code by accessing the device through the Xbox Live network, the company actually attempted to avoid appropriation and again changed the definition of the Xbox. The device then became a platform users would purchase just to access specific services. The product was not under the control of its owner, who purchased it, but was open for the producer to access and modify any time. As a result, the Xbox Live network was not just appropriated by hackers, but alternative networks, like Xlink Kai, were also developed to even free users from vendor dependency and allow all kinds of platforms to join in.

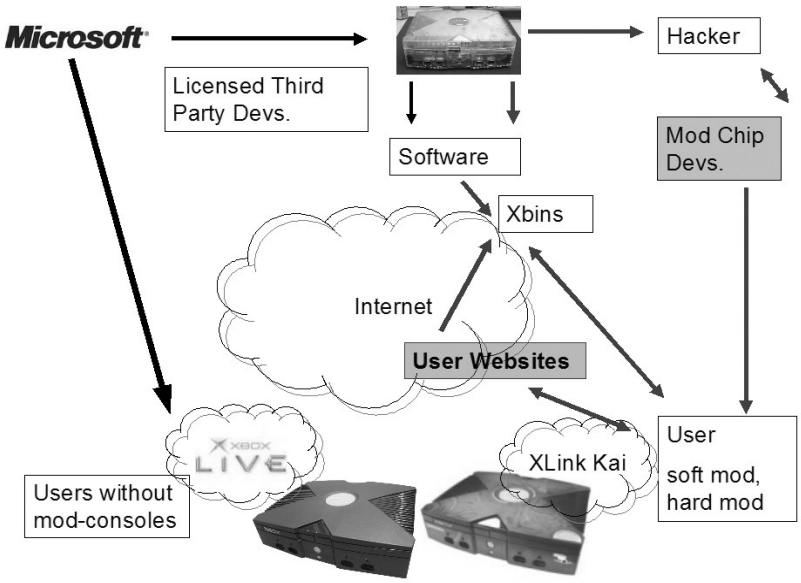

Fig. 9, Main actors in XDK case

The original Xbox underwent a transformation due to user appropriation; completely new features were developed, and a use now became possible that contradicted the vendor's business models. This transformation took place in an actor-network of communities, developers, media platforms aiming to represent communities and publishing-related news, and a range of technologies, such as the XDK, modchips, software bugs, source code repositories, ftp severs, etc. When designing a new console, Microsoft took into account the many experiences gained from user appropriation for the new design. Microsoft focused on increasing security features and attempting to avoid hacking. "There are going to be levels of security in this box that the hacker community has never seen before," announced Chris Satchell from *Xbox Advanced Technology Group*.[191]

[191] Alfred Hermida: Microsoft aims for hack-proof 360, in BBC News, Technology, September 9 2005, <http://news.bbc.co.uk/2/hi/technology/4218670.stm>.

Homebrew software was not Microsoft's main concern explains Andre Virgnaud, member of the Microsoft Xbox team, in his weblog, but so-called 'piracy' was. Microsoft's response to the appropriation of the Xbox through modchips had to be a design that would integrate as many attractive features as possible that users might miss, but above all exclude possibilities of playing copied games.[192] The Xbox 360 was released in late November 2005, and crucial changes to the design were made. The Xbox Live network was extended and now available for all users in a basic network service. More services and games were made available through upgrades. Also the operating systems requires regular updates and makes it difficult to be replaced through an alternative on a modchip. Along with connecting users seamlessly to the producer's network, many features from homebrew software were integrated into Xbox 360. The media center is very much like the Xbox Media Center developed by users. The previously "leaked" XDK was literally incorporated into the new design as an integrated development kit, the *XNA.*[193] So now, both professional and amateur developers could build applications for the Xbox 360. The problem of signed and unsigned code was abolished by offering a free version and acknowledging every user as a potential licensed developer. Joining the so-called *Creator's Club* for a annual fee of $99 would legalize the distribution of homemade programs. Non-commercial applications may be distributed and executed on Xbox 360.[194] Reasons to modify the game console for homebrew software no longer seemed warranted.[195] However, the Xbox 360 immediately stifled the homebrew scene's

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[192] See his posting on his weblog: *The problem with Modchips*, June 31 2007; <http://ozymandias.com/archive/2006/07/31/The-Problem-with-Modchips.aspx>.

[193] XNA stands for XNA's Not Acronymed, *XNA Frequently Asked Questions*, <http://msdn.microsoft.com/en-us/directx/aa937793.aspx>.

[194] XNA Creator's Club, <http://creators.xna.com/>.

[195] However many Xbox enthusiasts are unhappy with the new design and claim that the quality of homebrew applications, skins, and other features is rather poor in comparison with those available for the old Xbox.

output, and hackers lost interest to make developments for the 360, either due to the annually fee, or the requirement of developing in Microsoft's *.NET Framework* on which the XNA is based on.[196] Further more seems the Xbox 360 not as much widespread among hackers as the old Xbox. Modchip production for the Xbox 360 also changed radically due to the fact that the hack can not be protected with cryptography. The modchips can therefore easily be copied and reproduced at low costs by so-called "cloners" copying modchips and producing them en masse in Asia.[197]

The trail of the XDK reveals several important aspects of participatory culture: users and producers converge to an extent that requires defining the individual role of a participant at any given state of the production process according to his or her social context, institutional affiliation, access to either licensed or unlicensed means of production, technical skills, and the mindset motivating his or her labour. Furthermore, the XDK case shows how user appropriation and corporate design decisions are intertwined and stimulate one another. It demonstrates clearly that participation is not a homogeneous activity of users, but that companies are actively engaged in the process, too. In the context of participatory culture, the case of the XDK highlights an extension of the culture industries into the sphere of users and consumers who actively—driven by various motives—participate in further developing original designs by means of

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[196] The Xbox Media Center (XBMC) started to focus on platform-independent application development and Linux systems and Mac OS. See Joel Johnson: *Q&A: The Xbox Media Center Team on the Future of XBMC for Linux*, Interview posted on BoingBoing, August 28 2007. <http://gadgets.boingboing.net/2007/08/qa-the-xbox-media-ce.html>.
However, it was possible to hack an Xbox360 by exploiting a security hole in the DVD player of an early version. Those devices are able to play unlicensed copies. The Free60 project operates more in the tradition of the Xbox-Linux Project. The former aims to hack the recent Microsoft game console in order to execute Linux on it; so far, booting Linux on the Xbox 360 is only possible with devices produced before January 2007 with kernel versions 4532 and 4548. See: Free60, <http://www.free60.org/>.

[197] Many modchip producers, such as SmartXX, pulled out due to a lack of revenues. The hack allows to play copied games, but not the execution of a different operating system. It is therefore not possible to install and run homebrew applications as it was possible on the Xbox 360.

appropriation. Furthermore, it demonstrates how this labor can be integrated, or at least be beneficial, for new design developments by corporate producers. Following the "leaked" XDK and the unsigned code produced with it, reveals strategies of corporate control to response to the use of modified Xboxes. Microsoft employed several strategies to ban and aggravate unapproved use. But it is also recognizable how user appropriation explores the entire range of computer technology and software to circumvent those strategies of control and produce alternative solutions. However, these activities cannot be perceived as an independent culture detached from the world of corporate production as both are closely linked to each other on so many levels.

A Penguin on Bill's black box: the Xbox Linux Project

The *Xbox Linux Project* differs in an important respect from the XDK case. Its objective to install GNU/Linux on the Xbox unhinges it from the need to develop with the Microsoft Xbox Development Kit (XDK) and provides an alternative operating system and alternative software for the Xbox.[198] Instead of the original stripped-down version of Windows 2000, a GNU/Linux operating system was developed and successfully installed on the console. This accomplishment furthermore demonstrates an ideological impetus by "liberating" the consumer from the vendor's control and turning the limited functionality of the game console into an adequate and reasonable personal computer, based on hardware that is subsidized by Microsoft. Other motives for hacking the Xbox was to learn more about hardware architecture, reverse engineering and cryptography (Huang 2003). As well as writing a Linux-based operating system for a game console, that resembled a a common IBM-PC architecture. The idea of the computer as a multi-purpose device, accessible and available at low cost to anybody is a driving motivation behind the project and visible in its communication. The Xbox-Linux example, shows not only a clear collision of media practice and a business model, but also a confrontation of different socio-political mindsets.[199] The Xbox-Linux Project is embedded in an anti-proprietary

[198] Xbox Linux Project: <www.xbox-linux.org>.

[199] The project received a lot of media attention, and members attended important conventions, like the German *Linux Tag* or the prestigious conference of the *Computer Chaos Club*. Because project members were presenting themselves in public, a coherent appearance was necessary and thaaks to the effort of project leader Michael Steil, presentations, images, and movie files were produced for Xbox Linux. The focus on the Microsoft versus Linux narrative increased its popularity, and was conveyed by setting the Linux penguin mascot, Tux, on the Xbox and presenting it that way both at live events and in downloadable movie files on their website. The image of the penguin sitting on the Xbox made it easy to grasp the significance of the difficult process of migrating the former Microsoft game console to a Linux computer. It furthermore aimed to illustrate the right of customers to tinker with their purchased goods and articulated a call to limit the obstacles companies try to impose on their clients in order to prevent them from modifying their product. The project especially inspired activists and Linux enthusiasts who either were fascinated by Linux running even on Microsoft's game console or were already dreaming of hundreds of thousands of Linux Xbox systems being shipped to developing countries as cheap computers to diminish the digital divide.

software culture, and, referring to Benjamin, a specific socio-political attitude is affecting the appropriation of a greater potential for participation.

Founded in 2002 by German computer science student Michael Steil, the rather small group of five to ten project members managed a great deal of *reverse engineering* on the Xbox to develop a GNU/Linux distribution for the console.[200] Later, the project was funded by an initially anonymous sponsor, the project gained an efficient capacity for action and organized a hacking contest, in order to find a way of executing non-system code without requiring a modchip. For this they offered a prize of $100,000.[201]

Clearly their activities contained an ideological overtone. The welcome screen on their Xbox-Linux says (see fig. 10):

> Welcome to <u>your</u> box," emphasizing the possessive pronoun, and referring to the alleged collective intelligence and the community ideals of open-source software and active participation: "You don't have to be a passive consumer of corporate content. With Linux you can plug into a world of sharing and contributing, you can be part of a worldwide community where ideas and software are free.[202]

[200] Reverse engineering describes the process of following design steps backwards in order to comprehend the technical design. A great deal of the hacking of the Xbox was accomplished and documented by Andrew 'bunnie' Huang (2003). The Xbox-Linux Project analyzed the mistakes Microsoft designers made with the Xbox security design and summarized their findings in a paper; see Steil, Michael. 2005. 17 Mistakes Microsoft made in the Xbox security system, *22nd Computer Chaos Club Conference*, online: <http://www.xbox-linux.org/wiki/17_Mistakes_Microsoft_Made_in_the_Xbox_Security_System>.

[201] The anonymous sponsor turned out to be Micheal Robertson, former MP3.com CEO, self-appointed and long-time Microsoft enemy, and founder and CEO of Lindows OS, a Linux-based operating and office system for desktop computers. Robertson's sponsorship, which totaled $200,000, does not only reiterate the existing ties between hacker communities and commercial enterprises but also confirms the Linux concept of promotion behind the venture, and has a crucial effect on the project's media appearance. Robertson's involvement gave the project an even more anti-Microsoft slant since the entrepreneur was in conflict with the software corporation in several lawsuits about the brand name of his Linux distribution, initially called *Lindows*. More information on Micheal Robertson's MP3.com enterprise can be obtained at Alderman (2001:46-55).

[202] However, their emphasis might also be a pragmatic choice to meet the expectations of Linux enthusiasts, since the project quickly received attention from Linux communities and was invited to exhibit at the German Linuxtag and other occasions. As pointed out by Ed in an interview, there was all of a sudden a need to communicate the project to a broad range of people and media, and many choices made in the style of communication benefited from the overall narrative of Microsoft

The appropriated Xbox shows that this was not an empty claim, but rather something realized in the modification of the design. The members of the Xbox-Linux Project were primarily Linux enthusiasts and not gamers. Demonstrating a distinctly sportive attitude they sought the best ways to hack the Xbox in order to execute Linux.[203] Another ideological motivation emphasized on the project website and frequently disputed in the press was the fact that the Xbox was being sold at half the price of a regular PC but offered equivalent features (Takahashi 2006:58).

A first booting of GNU/Linux was achieved in August 2002 but still required a modchip. Neverheless, the press release announced:

> This is a landmark in the struggle for control of the Xbox, which features PC-like hardware, an Intel CPU, a standard hard disk drive and DVD drive. Microsoft had been counting on the purchasers of the Xbox remaining passive consumers of paid-for content [...] However with the first release of Xbox Linux, consumers will soon have a choice to connect to the normal Internet, using normal browsers, and run any Linux programs for free. They will also be able to play any audio (e.g. MP3) and video content they choose without restrictions.[204]

versus Linux.

[203] As Xbox-Linux Project member Ed states, "It is about porting Linux on proprietary devices, but once I see Linux booting on them, I see the objective realized and loose interest in further development work." This is a reason why Ed is not interested in working on Playstation 3, which allows installation of Linux. "I saw Linux booting on the Playstation 3 and knew enough; there was no reason to deal with it further."

[204] Mixchael Steil: Linux successfully operating on Xbox for first time, press release, August 16 2002, online: <http://xbox-linux.sourceforge.net/docs/prlinuxoperating.html> (June 2007).

In March 2003 hacker *Habibi_xbox* won the hacking contest by booting Linux successfully without using hardware modifications.[205]

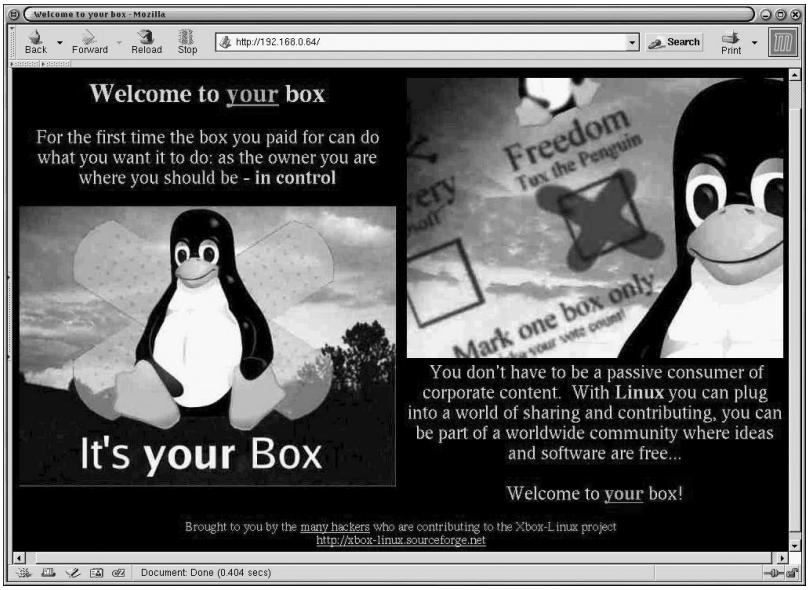

Fig. 10, Welcome slide of Xbox-Linux.

The hacker took advantage of a software bug, a so-called buffer overflow, which emerged in the "save/load game" function of the game *James Bond 007: Agent Under Fire* (Electronic Arts 2001).[206] Instead of loading the game, the Xbox would allow any code to run after the buffer overflow crashed the system. The procedure is possible with other games as well, such as *Mechas-*

[205] David Becker: Hacker Cracks Xbox Challenge, News.com, March 31 2003, <http://news.com.com/2100-1043-994794.html> (June 2007).

[206] There have been other games with an exploitable software bug as well, such as the classic game Frogger (Konami 1981) that has been released for the Xbox in the US. A member of team habibi, which is responsible for the 007 hack, points out that they tried to find a game that was widespread. James Bond 007. Agent Under Fire, was not only popular, it also featured a "cool title". Further more the exploit was fascinating, because it demonstrated how to circumvent so-called trusted computing technologies, such as embedded cryptography keys. The disadvantage of 007. Agent Under Fire was its region code, which required the use of four different hacks to disable. Another possibility to hack the Xbox in order to circumvent the vendor's control of executable code, was found in the Xbox dashboard.

sault, or *Tom Clancy's Splinter Cell*, where bugs have been found that can be exploited in the same way. The members of the Xbox Linux Project created a software called *Mechinstaller* that facilitated the so-called softmod of an Xbox. Noteworthy is not only that commercial software again can be exploited for uses unapproved by the original designer, but also that this appropriation is then quickly formalized in a new software application, the Mechinstaller, and easily distributed. However, Microsoft used its Xbox Live network to update the consoles' software and close the security holes that were exploited by hackers. By accessing the users' game consoles, the company attempted to exert a certain amount of control after releasing the product into the market.[207]

Aside from the Xbox Linux Project, other opportunities for softmod were further developed and led to the production of easy-to-use cartridges and softmod manuals that helped less skilled users to modify their game console. The Xbox Linux Project increased assistance to less skilled users by writing a detailed step-by-step manual for modding the Xbox and installing a Linux distribution.[208] A group of enthusiastic users offered their help to less skilled users. Eventually the Xbox Linux Project provided a Boot CD Image, which users could download to set up the Linux operating system. Here, the hacking process itself transformed into a stable solution enabling unskilled users to modify their Xbox on their own. By 2006 the developers had succeeded in running Linux on the Xbox in a stable way, and in reducing maintenance to a minimum. That year, the project was awarded the Community Award in the category of hardware on the prestigious Sourceforge.net website, where the Xbox Linux Project was hosting their software.

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[207] As mentioned above, software updates became a strategy for companies to keep in control of their products and to adapt their software to prevent user appropriation. Software updates can also be used to exert a certain amount of control and exclude users violating the terms of use from certain services and warranty claims. However, this dynamic has lead to a competition between users and companies. The corporate design attempts to regulate the use, while the users appropriate the new design version again, or circumvent it by re-installing an earlier firmware version.

[208] Xbox Linux Project, Getting Started: <http://www.xbox-linux.org/wiki/Getting_Started>.

The Xbox Linux Project can be described as an active, straightforward software development venture with an efficient division of labor. Along with the core developers, a group of 5 to 10 people, and another group of approximately 35 users, helped to maintain the project extending the website, writing and translating manuals, providing artwork, and answering user questions. Inexperienced users could look up skilled users in a database and visit them in real life to have the game console modified. Here, the project benefited significantly from the efforts of those who actively took part in developing the community.[209] As a result of volunteer efforts, the Xbox Linux Project page, in addition to English, is also available in French, Spanish, Polish, Dutch, and Finnish. This is yet another demonstration of the dynamics of user communities in developing technical skills and sharing knowledge.

Again the Xbox-Linux Project shows that computer technology can be used differently than intended by their original designers just by changing the devices operating software. The Xbox served as a software environment for the 'special machine' designed as Microsoft Xbox software, which then was replaced by the Xbox Linux software. As the Xbox-Linux Project unfolds it shows the capability of

[209] The heterogeneity of the members is perfectly illustrated in the "user help user" section of the project's website. According to the level of difficulty, members work on different tasks. Later, when the number of participants grew, they offered user help user, the so-called *chocolate project*, offering installation services for those who felt uncomfortable using the step-by-step guide to modify their console. The user help user pages can be found at: <http://www.xbox-linux.org/wiki/Users_Help_Users>.
A table lists users who are willing to help other users installing Linux on the Xbox. The table also differentiates their skills, assigns profiles from hobbyist to hacker or electric engineer and identifies what users would like to have for returning the favor. The name chocolate project refers to the habit of making it up to the volunteers with candy or chocolate. A code indicates constraints on personal visits for reasons like "*3: with appointment, I'm 13 yrs old got homework and school and social life, and i gotta ask my parents." Some users link to their personal section in the project's website where they introduce themselves, speak of their motivation, skills, and interests. Such member sites are also common at Wikipedia, where a large number of registered users present themselves to the community.

According to core members of the Xbox-Linux Project, enthusiast users, who were less skilled in hacking and programming, were crucial in assuming the task of explaining the application and processes to really inexperienced users. Hacker Ed from the Xbox Linux Project appreciates the collaboration of less skilled users, as much as the collaboration of experienced hackers. He says that the core developer group would not have the time to maintain the mailing list and answer all kinds of questions.

users to accumulate resources in order to set up and accomplish a hacking and software developing project. Many tasks were fulfilled in a semi-professional way, and some participants were professional programmers or computer science students. Nevertheless, a significant contribution came from a group of computer game or GNU/Linux enthusiasts collaborating for various reasons and according to their personal capabilities and skills. It shows that community-driven collaboration works even with a limited common objective. The only objective was migrating Linux on the Xbox, which became for some members an anti-Microsoft mission, and was perceived so by the press, while for others the main objective was the technical challenge of hacking the Xbox. It is an example of explicit participation, a conscious undertaking, well received by the press, that raised funding and media attention, and allocated the necessary resources to achieve the set objectives. This successful appropriation demonstrates the extent to which software-based products are open to modification and how their basic affordances affect later use. An Xbox has little in common with its original design once GNU/Linux is booted on the device.

Hacking the AIBO and teaching Sony to back off

The *Aibohack* case is a prime example of the valuable contribution users can make to sophisticated consumer goods by offering support to other users and developing additional features for the product. It furthermore illustrates how user communities may defend their cultural freedom to modify products they have purchased. When Sony tried to shut down the distribution of non-corporate software for the robot dog AIBO on Aibohack.com, user communities generated attention for their case and made mainstream media news.

In 1999 Sony introduced a highly sophisticated product into the market of electronic consumer goods. The AIBO[210] is an electronic robotic dog with abilities to learn and to express different 'moods'. Equipped with a camera, touch and audio sensors, a memory stick, 16 MB RAM, and a 32 bit processor, the pet could walk, orientate itself to its surroundings and respond to user actions.[211] *Tamagotchi*-like the owner had to pay attention to the dog and could influence its learning processes. The AIBO provided a sophisticated set of interaction possibilities due to its touch sensors, audio interface for voice recognizing voice commands, and various ways of expressing different moods. Like all software-based products, the AIBO was open to modification and could offer a wider range of functions than its original designers imagined. Similar to the cases discussed above, user community websites served as important media platforms for exchanging information and contacting other AIBO owners. Furthermore the websites facilitated communication between skilled users, able to develop programs for the AIBO and less skilled users.[212] The USA-based

[210] The name is a play on words derived from the abbreviation **A**rtificial **I**ntelligence Ro**BO**t and means love or partner in Japanese. See Sony 2004 Basic Manual for Aibo.

[211] Those specification apply for the AIBO models ERS-110 and ERS-111. The later released ERS-210 series came with 32 MB RAM.

[212] I discussed this case in two articles, one on user participation (Schäfer 2004a) and one on digital culture industries (Schäfer 2004b).

hacker Aibopet, who calls himself "just a robot hobbyist", was among the first to examine the AIBO.[213] On his website Aibohack.com, he started to publish small programs he had developed to extend AIBO's abilities. Using his software only required a Sony memory stick applicable to the AIBO product model in question. Aibopet's programs were extensively promoted on the AIBO community websites. Besides offering new programs and receiving ideas for new ones, Aibopet answered questions and offered support for less skilled AIBO owners. Although he offered applications and services free of charge and was actually adding value to the AIBO, and also despite the fact that he was very much appreciated in user communities, he was threatened by a cease-and-desist letter from Sony in 2001: "Sony is excited about your enthusiasm for AIBO, but is very concerned by the manner of distribution of your original contents".[214] In a meeting with representatives of Sony, Aibopet tried to explain that his distribution of applications wouldn't harm sales or the development of AIBO. In fact, the opposite was true, since Aibopet was offering support the company was not able to maintain and he was expanding the value of AIBO to users, since Aibopet's programs made the robotic dog much more attractive. With programs like Disco AIBO, the little robotic dog was able to dance to tunes on the radio, *AIBO Scope* captured the pet's perspective and Bender AIBO made the dog talk like the homonymous robot in the popular TV series *Futurama*. Aibopet explained in the aforementioned meeting why Sony's $500 software *Master Studio* was not suitable for developing applications like *Disco AIBO* and demonstrated the free software extensions he was offering on his website. Actually, the extensive use of these programs required users to buy more

[213] Aibopet claims that many people who have purchased an AIBO were actually not robot enthusiasts or technically advanced users. However, in using the AIBO and installing homebrew software their knowledge has been extended substantially. It has to be mentioned that AIBO also became a popular gadget and a frequently used platform for artificial intelligence and robotic technologies researchers.

[214] Aibohack, first letter, April 20 2001 The letter was published on Aibopet's website <www.aibohack.com/legal/letter1.htm> but was eventually removed.

memory sticks from Sony. Obviously this was a case of a skilled user actively participating in the enhancement of a product's value, and he even provided competent support, thus constituting user participation and diminishing the gap between corporation and consumers. Up to that point, the problem seemed solved:

> In the intervening months, while discussing various AIBO things with Sony/ERA/ERC representatives, no 'legal' issues are raised. I (foolishly) believe they understand the value I provide to their product line, for free. I believe they will let me, at least implicitly, continue my work. Even at Robocup (early August) nothing was mentioned to me on the topic by ERA/Sony representatives. In fact I received an embarrassing amount of praise, including some from the Japanese engineers.[215]

But on October 26, 2001 a second letter required Aibopet to suspend offering 14 of his AIBO programs on his websites.[216] In response, Aibopet shut down his websites aibohack.com and aibopet.com entirely, but not without publishing Sony's letter first. He also asked all websites mirroring his download section to discontinue that too. When Aibopet published that letter, it was picked up by the user community websites and a process of agenda setting was initiated that would soon hit the mainstream media. Sony's cease-and-desist letter shows how user communities can generate attention and how special-interest websites, mailing lists, and commercial media are interrelated. Figure 11 shows how the news spread from community websites to media such as the *LA Times* and the *New York Times* (Schäfer 2004:69). On Friday 26, the closing of Aibopet's websites was announced on the several AIBO user community websites, such as *Aibosite.com*, *Aiboworld.co.uk*, and *Aibo-life.com*. Users immediately began writing online petitions, demanding Sony to suspend legal threats, and they

[215] This points to an interesting dynamic inside the companies. Engineers involved in research and development can appreciate user appropriation differently than people from the legal department. However, the management probably is more open to the concerns of the legal advisors who then can dominate the companies actions with their proposals and strategies.

[216] For a discussion of the DMCA and Sony's actions against Aibopet see Lessig (2004:153-154)

even called for a boycott of Sony products.[217] The next day the news was featured on the important platform *Slashdot.org*, a website on information technology news and related issues. When Slashdot features articles, related websites can easily collapse under the volume of visits, a phenomenon called '"the slashdot effect".[218] The week following Slashdot's report, special-interest media from all over the world covered the altercation. "Sony Dogs Aibo Enthusiast's Site" read the *LA Times* headline, and the widely read German technology forum Heise announced "Aibo Hacker Gives Up". The articles were joined by many newsletters, mailing lists, and other websites linking to them.[219] The story was discussed on the influential mailing list *Nettime*, one of the oldest forums for critical commentary on the Internet and related political issues, and it was being circulated on web forums and on mailing lists dealing with questions of copyright and the Digital Millennium Copyright Act (DMCA). It also appeared on the English and Japanese *Wired* magazine's News, the English and Japanese edition of ZDNet, the *New York Times*, the Newscientist.com, and elsewhere.[220] Within a week the news spread worldwide, especially in technology and digital

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[217] Aibo-Life.org: Open Letter To Sony ERA, October 27 2001, online: http://www.aibo-life.org/forums/cgi-bin/ultimatebb.cgi?ubb=get_topic&f=1&t=000390#000000 (June 2007). Get Aibohack.com back online, online petition postet by

[218] Slashdot, October 27 2001: Sony Uses DMCA To Shut Down Aibo Hack Site: <http://yro.slashdot.org/article.pl?sid=01/10/28/005233> (June 2007).

[219] Wilson, Dave; Pham, Alex: *Sony Dogs Aibo Enthusiast's site*, *LA Times*, 1 November 2001; the online version <http://www.latimes.com/business/la-000086726nov01.story?coll=la%2Dheadlines%2Dbusiness> is no longer online, but a shorter version is available at: <http://www.acm.org/technews/articles/2001-3/1102f.html#item9>, (September 19 2003). Heise News: *Aibo Hacker gibt auf*, heise online, 29 October 2001, <http://www.heise.de/newsticker/data/wst-29.10.01-003/>, (August 27 2003).

[220] Greame Wearden: *Robotics enthusiast forced to pull Aibo-altering code*, ZDNet UK, November 1 2001, <http://news.zdnet.co.uk/software/0,39020381,2098461,00.htm> (June 2007); Farhad Manjoo: Aibo Owners Biting Mad at Sony, Wired News, November 2 2001, <www.wired.com/news/business/0,1367,48088,00.html>, (June 2007); Amy Harmon: Compressed Data; Put Off by Disco Dancing, Sony Tightens Leash on its Robotic Dog, *New York Times*, November 5 2007, <http://www.nytimes.com/2001/11/05/technology/05AIBO.html?ex=1182139200&en=a560e9496e3151a1&ei=5070> (June 2007).

culture-related media, fostering a sense of community among the different AIBO user websites.

Day	Media						
Oct 26	aibosite.com	aiboworld.co.uk	Aibo-life.com				
Oct 27	Slashdot.org						
Oct 28							
Oct 29	Heise News (D)						
Oct 30	New Scientist.com						
Oct 31							
Nov 1	LA Times	CNET News.com	ZDNet UK	IT Avisen (NO)	Internet Security News	Digital Copyright (CAN)	Interesting-people.org
Nov 2	ZDNet Japan	Wired/Yahoo JP	Wired	DMCA discuss, Nettime	Nettime		
Nov 3	Hispasec.com						
Nov 4	Linuxparty, hispalinux						
Nov 5	New York Times						
Nov 6	Ananova.com						
Nov 7	AP, dig Mass.	Midrange.nontech					

Dec 1	LA Times						

Fig. 11 Media coverage of the Aibohack-Sony confrontation (Schäfer 2004:69)

The news appeared at a time when audiences were becoming sensitized to issues pertaining to the Digital Millennium Copyright Act (DMCA). Users were alert to the fact that companies would use the DMCA, a confining adaption of copyright law, to limit their freedom in using products according to their needs and also use it to stifle critics and exclude unwanted competition from the market.[221] The news of Sony's cease-and-desist letter reached already alarmed audiences in various *issue networks* (Rogers) related to debates about the DMCA, music file-sharing and downloading, free software and the threat of software patents, consumer rights, and digital citizenship, etc. Even in communities not involved with the AIBO and its related groups, the case became another

[221] In June 2001 the case of the Russian PhD student Dmitry Sklyarov, who was arrested at the behest of Adobe at the hacker convention *Defcon,* made worldwide news and alerted programmers and activists alike. As early as April that year, Princeton University professor Edward Felten was threatened with legal action by the Recording Industry Association of America (RIAA) were he to publish his research on copyright protection mechanisms.

example of repressive copyright law. One could claim that the widespread concern about DMCA-related actions taken by corporate companies against programmers and customers led to a more rapid dissemination of news about Aibohack. In the eyes of the media, the David-versus-Goliath image of enthusiast users fighting for their cultural freedom against a major enterprise made the story an easy pick, which the *Wired* headline "AIBO Owners Biting Mad at Sony" attests to.[222]

Loyalty has been described as a participatory relationship (Sennett 2006:64) which is increasingly present in organizations with high social capital. Although it may be going too far to characterize loyalty as the driving force behind the uncoordinated but effective actions of user communities and individuals, a shared understanding of values and a common sense of defining cultural freedom formed the ideological base of these actions. A form of civil engagement emerges when companies confront their users with legal action (Uricchio 2004). Although not necessarily united by the same interests and causes, Sony's actions provoked a concerted, albeit not centrally organized response. Forcing Aibopet to shut down his websites made several things clear: a large community —the AIBO users affiliated to the different AIBO user websites—felt their cultural freedom was under attack and perceived the company's actions as deeply unfair.

The communities immediately took the initiative and generated attention for the case, contacted Sony with petitions for settling the issues with Aibopet, and threatened to boycott the company's products. Postings in many online forums made it clear that Sony had not only been unable to offer the necessary support a sophisticated product like AIBO required, but they even lacked the proper

[222] Sony repeated its mistake. When in 2005 software security expert Mark Russinovich found a rootkit hiding in music a CD released by Sony subsidiary BMG, the news reached an audience already alert to digital restriction management systems. In this case, Slashdot spread the news again, and it hit mainstream news and turned into a major scandal followed by lawsuits against BMG and a damaging loss of reputation.

documentation and help manuals as well. The posting with the subject *Shame Sony...* by user Dale to Aibosite's BBS expresses what AIBO users thought in general about Sony and Aibopet:

> Subject: Shame Sony...
> Posted By: Dale <dale_white@mac.com>
> Date: Sunday, 28 October 2001, at 2:42 p.m.
>
> Hi everybody.
>
> I just want to say, how angry I am for Sony for causing the closer of Aibohack. If it wasn't for site such as Aibohack or this one [bbs.aibosite.com], I would have never of purchase an Aibo with his extra's.
>
> 'THE AIBO MANUAL IS UTTER CRAP.'
>
> IT TELLS YOU NOTHING. MY AIBO TRIES TO COMMUNICATE BUT THE MANUAL TELLS YOU ABSOLUTELY NOTHING ABOUT THE TONES OR BODY LANGUAGE. IF WE DO NOT KNOW THE LANGUAGE THEN HOW CAN WE UNDERSTAND.
>
> Because of Aibohack and this site, I could understand my new pet and enjoy him.
>
> SONY YOU HAVE DONE IT AGAIN. STUFF YOU I NOT BUY ANOTHER AIBO, OR ANY OF YOUR ENTERTAINMENT ROBOTS AGAIN 'UNTIL YOU GET YOUR ACT IN ORDER'. SONY STOP BEING AN ARSE HOLE TO YOU CLIENTS, 'WE PAY YOUR BILLS AND WAGES'
>
> Dale
>
> (emphasis in capital letters, and spelling in original posting).[223]

This posting highlights problems that are deeply related to both the complexity of the software and Sony's corporate structure. Poor documentation is a recurring problem in software development, and software-based products are highly familiar in the field of open source, where developing communities don't have the resources or see the need to provide manuals and documentation. In the case of the AIBO manual it became clear that it did not sufficiently explain the

[223] Posted by Dale on Sunday, 28 October 2001 to Aibosite, <http://bbs.aibosite.com/index.cgi?read=33840> (June 2007).

product and its nature. The electronic pet was far more complex in its body language and communication than the manual suggested. According to Aibopet, each launch of a new AIBO model increased the number of questions users sent him.[224]

Despite Sony being a huge enterprise with many different departments, the AIBO saga is a perfect illustration of the right hand not knowing what the left hand is doing. While the research and development department produces highly complex products, departments responsible for customer relations and marketing are unable to meet customers' needs. On the level of product promotion, Sony underestimated the tentativeness of the AIBO, a product that was open to modification and further development by users due to its technological features.[225] A community of enthusiastic users will always come up with more ideas for a software-based product than any marketing brainstorming session will achieve. In a digital age, in other words, vendors should recognize that their software-based products are destined to be further developed once they enter the sphere of users. Acting accordingly, they try to reduce the gap between users and the corporation, which would benefit the company's interest in improving products, services, and customer satisfaction. This is even more true in the case of a product like the AIBO, which fascinated computer novices and artificial intelligence researchers alike. Since both groups could meet on user community websites, a profound knowledge exchange took place between them. An more alert company would have recognized an opportunity for

[224] In a period when no new AIBO model is released, Aibopet usually spends up to three hours per week just answering AIBO user questions. With the release of new AIBO models this amount increases accordingly.

[225] This aspect manifests itself also on the technical level. The software Sony provided for users to edit programs for the AIBO was confining and poorly designed. Aibopets hacks compensated for many shortcomings in Sony's programming work. The AIBO editor developed by Aibopet in early 2000 worked much better than the pricy *AIBO Performer* Sony provided. His *AiboPet Editor* was eventually implemented in a new version developed by Sony and released in 2001 as Master Studio Editor. The stunning similarity of the Graphical User Interfaces and the features are documented at Aibohack, <http://www.aibohack.com/copyme/editor.htm>

winning over those platforms as an interface between corporation and customers.[226] Eric von Hippel has convincingly argued that users participation in research and development, e.g. through user appropriation, can contribute substantially to innovation and product improvement than market research surveys (1988). The paradigm of corporate control might stifle many innovative ideas and slow down improvement processes for products. A participatory culture is challenging management theories theories to question their approaches of control and feedback, in order to develop more advanced strategies to integrate user activities into their development processes.

The detailed knowledge Aibopet acquired by hacking the AIBO models became a valuable resource to the rest of the community, as did the extra features offered on Aibohack.com.[227] But this knowledge also spread to communities where users were increasingly capable of supporting each other and providing answers to frequently asked questions. The communities appeared to be important link in creating and maintaining a knowledge base on the product in question and stimulating improvement and further development. The tight-knit cohesion among different user websites and affiliation with multipliers like Slashdot and influential media like *Wired* magazine guaranteed the necessary attention and might well have exerted considerable pressure on Sony.

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[226] When Sony failed to appreciate the user communities and Aibopets' software development, they missed out on the chance to engage actively with the communities and learn from consumer needs or stimulate collaboration. According to Aibopet, Sony employees were only passively following developments in the user community. An example of active participation by both company and users developing and appropriating software would be Google Maps (Rieder 2007).
Another example is the computer game industry. Here users are appreciated as constituents of credibility, improvement, and the expansion and maintenance of communities. By creating game modifications, users actually create new business opportunities for the copyright-owning industry. By building and maintaining communities related to games, users create an active and enthusiastic base of users and bring them closer to the product, to the game.

[227] Aibopet's significance for the AIBO user communities is evident from the amount of postings on bbs.aibosite.com, where more than 10% of all messages are either written by Aibopet or refer to him and Aibohack.com (5,851 of 48,249 messages by June 14 2007). Source: <http://bbs.aibosite.com>, search string Aibopet or Aibohack between January 1 1999 and June 14 2007.

So far, the AIBO example demonstrates:

a) The significance of user communities and social networks

b) The impact of media and representation channels that cover users' issues

c) The importance of skilled users as agents of improvement, innovation, and support.

Under the surface of advertisement, marketing campaigns, and product definitions, products start leading their own lives no matter what kind of spin the company presents them with. Software-based products, software applications and their appropriation by users constitute a new area of conflict that requires from all participants to develop ways of interacting with each other in order to adapt to the new situation. Companies that refuse to acknowledge that their own product is barely under control, far too complex and sophisticated, and therefore partially unfamiliar to its creators, can lose the product, their clients, and eventually the initiative to engage in the market. The conflicts caused by colliding mindsets and challenged business models lead to to reconfigurations of company-consumer relations. Ultimately, Sony withdrew its claim against Aibopet and on November 23 2001, just four weeks after the cease-and-desist letter was sent, Aibohack.com was up and running again. Sony decided to become more open to the community and announced an open software development kit, the *Open R Software Development Kit*. Aibopet was invited to beta-test the software. According to Sony Austria executive Helmut Kolba, the experience with the AIBO community generated change. The company realized that a top-down approach to software-based products was not working. But even today, years after the Aibohack incident, many companies have not managed to establish a productive relationship with their most enthusiastic customers. As Aibopet pointed out, Sony was merely granting the freedom to tinker with AIBOs, and while Sony employees were lurking on the AIBO community sites,

no real interaction took place, let alone collaboration. But Sony integrated many of Aibopets' designs and improvements into new AIBO models and their related software.[228]

Ultimately, the type of user participation presented in the case above has to be characterized as heterogeneous. Such a view refutes an image of user groups as mere hobbyists working solely in their leisure time, intrinsically motivated by their opposition to commercial production. Especially in the case of the modification of electronic consumer goods, the initial producer, hobbyists, and commercial third-party developers are closely linked, and individuals participating in this production often belong to more than just one of these groups simultaneously. Participation is in the first place heterogeneous with respect to the active contribution and the status of the user. The user might be a computer novice but also an expert and employee of a corporation or a hobbyist. The term user can also describe a company using several tools. Users are heterogeneous in their status within the various stages of the production process, as their respective use of tools is heterogeneous with regard to licensing or unlicensed use. In the second place, the motivation to participate is equally heterogeneous and far less related to the frequent claim that participants are primarily fans. Although participants are often fans, many of the reasons for participation are related to the development and execution of technological skills, the aspect of doing something that was not initially intended by the original producer, and of course the aspect of developing a distinguished personal profile for competing in an online community.

[228] In January 2006 Sony announced to discontinue the production of AIBO. A still very active community remains developing applications as well as maintaining their social networks, where they share their dedication to their electronic pets.

Heterogeneous participation

Examining exemplary cases of appropriation and the interrelationship between users and corporate designers illustrates that collaboration between users and producers unfolds on many different stages of the design and appropriation process. Depending on their involvement and technical skills, users perform different tasks. The majority of users just employ the applications and services offered by those users who are more involved into the process of production and modification. A comparatively small group of expert users provides content and services and develops new software. But less skilled users also contribute to the development of new software by formulating their wishes and posting new ideas. This actor-network is characterized by heterogeneous activities and collaboration between different participants.

The teams of hackers seem to be quite small. The main group developing Xbox-Linux consisted of five people handling the bulk of programming. Various phases of the project took place in temporary collaborations between people who are not necessarily members of the team. The same is evident on the larger scale of community websites and in various hacking groups. Even if a user group could be identified as a group of people interested in a certain electronic consumer product, the group itself would be very heterogeneous. Members differ in motivation, involvement, and skills. For example, the majority of game console users are solely interested in playing games without having a need to connect to a user forum. Another large group uses community websites for information, news, and to learn about *cheats* and *exploits*. Maintaining a forum or a website and participating actively in the process of communication online does not necessarily require technical skills, but social skills and time are necessary. Users that have no programming skills may also assist by beta-testing software; their feedback helps developers make improvements. The game developer *iD Software* was the first company to invite users to beta-test new games. Users were glad to participate in the process of game development and

even wrote patches for the bugs in the software.

A smaller group of users is able to program with software development kits and write complete applications or hack software. They build software such as the *Xbox Media Center* (XBMC) or the *Open XDK*. They often refer to less skilled users or beginners as *noobs*, and exclude them from their communications because this stifles their work process. However, on important community platforms, such as Xbox-scene.org, hackers and less skilled users can and do communicate. The platforms are important to channel attention and promote hacks and homebrew applications.

In an attempt to categorize members of the heterogeneous user groups, one could differentiate them in terms of their motivation (gaming, hacking, social networking, etc.), involvement (time, participation, social network, etc.) and their skills (from playing games to hacking).

In the case of game-console users this could lead to the following provisional taxonomy:

- **Lay user**: uses the console for gaming, usually an unmodified console
- **Expert user/gamer**: uses the console extensively for gaming, often a modified console, uses of lots of copied games, participates in online communities for gamers, possibly provides PlugIns, manuals, FAQs, and administrative tasks for the community.
- **Expert user/modder**: uses the console often for activities other than gaming, participates in extending the functions of the console, is able to write code, provides applications, installs modchips or software solutions that are equivalent to modchips, often helps common users obtain modified consoles.[229]

[229] An example of an expert user would be *Xwarrior*, who is active on *Xbox-scene.com* and who calls

- **Expert user/hacker**: mostly interested in the technical aspects of consoles, hacking the platform, and providing applications for various uses, able to work with developer kits and debug kits.[230]

In the conventional thinking of the culture industry, a group of professional producers develops artifacts for leisure-time audiences. This clear-cut distinction between work time and leisure time, between monetary-based professional and non-monetary activities, and voluntary labor can no longer be sustained. Neither is it possible to draw a picture of an emerging alternative form of production, because it is often difficult to separate professional from intrinsically motivated production. The distinction is particularly difficult to make among those who actively participate in open-source communities, the fan culture, or other communities developing knowledge and producing artifacts. Professional web designers participate in the collective production of frameworks and other means of production on a global scale, means which are crucial to their local business for developing customized web applications.

User participation has a profound impact on the process of design. The resulting design formalizes many aspects of appropriation and integrates them into new design developments. It can even exceed what Feenberg observed about lay participation in design processes:

himself a "frequent gamer, playing at least a couple of hours a day, posting a lot on a forum, and chat with some friends." He describes the Xbox-scene.com platform as a place "where noobs ask all kinds of stupid things, but it's also the place for developers to get some attention". Xwarrior writes patches for programs that don't work well and does some beta-testing. His motivation is the fun of it. Interview by members of my Utrecht research team with user Xwarrior conducted on IRC, 9 October 2005.

[230] The development of software does not take place on a platform like Xbox-scene.com but in small teams, who usually maintain a website. The *Aftershock Team* would be an example of a small group of gamers and developers who program homebrew software for the Xbox. Games from other platforms such as Macintosh are posted by the Aftershock team to the Xbox. See Aftershock Development: http://aftershock.xbox-scene.com/.

"Lay initiatives usually influence technical rationality without destroying it. In fact, public intervention may actually improve technology by addressing problems ignored by vested interests entrenched in the design process. If the technical professions can be described as autonomous, it is not because they are truly independent of politics but rather because they usually succeed in translating political demands into technically rational terms." (Feenberg 1999:89)

As Eric von Hippel argued in *Democratizing Innovation*, many software-based products are actually significantly improved and developed through appropriation by users. As opposed to many accounts on participatory culture, Hippel does not refer to fans, but to professional users, e.g. librarians and medical technicians improving the products they use (von Hippel 2005). While Feenberg's notion of lay participation focuses on the level of socio-political engagement, Hippel's examples describe engagement on the level of technical design. In software-based products, both aspects often appear simultaneously. As the example of the concerted actions of AIBO users illustrates, technical appropriation and socio-political activities unfold in tandem, because the use of the products in question affects a cultural practice that needs to be established and defended against other interests. This argument has been made with respect to information systems in general (Ciborra) and the Internet (Abbett), where users are recognized as crucial factors not only for the development of new kinds of use but by virtue of their constituting a cultural practice along with shared values and an understanding for technology's cultural meaning. In that respect, appropriation of design not only changes products but affects society (Bijker, Law 1992). Speaking of participatory culture therefore means acknowledging users as active agents of technological change.[231] But rather than

[231] Users appropriation can be perceived as a mode of *improving* design. This perception supports the argument for an understanding of technology developing rather through continuous improvement than through revolutionary inventions. For an account of the history of technology as an improvement of design, see Friedel 2007. A Culture of Improvement. Technology and the Western Millennium. Cambridge, MA: MIT Press.

perceiving their labor only as a radical grassroots movement, an anti-hegemonic subcultural achievement, or an alternative mode of production, an adequate understanding of such phenomena needs to acknowledge the deeply intertwined relations between the sphere of so-called amateurs and professionals.

4.2 Participation as default design

The hacking and modifying of electronic consumer goods described in the previous sections suggests that participation is generally understood as an explicit activity either intrinsically or extrinsically motivated, that is a conscious and voluntary act of cultural production that I have labeled as explicit participation. The cases discussed above, in other words, connect community-based production processes with a high degree of communication and an organizational structure for project management. But alongside such explicit forms of participation, there are also others that are neither intrinsically or extrinsically motivated, but rather motivated by the design of an information system itself, with a low degree of communication among participants, and taking place in a social structure that cannot be described as a community. Many popular Web 2.0 applications and services serve as a platform for the kind of user activities described in section 2.2 as accumulation, archiving and construction. Participation can in fact also be formalized as a default design feature that unfolds as an implicit activity. This form of implicit participation is intrinsically related to the Internet and the World Wide Web. As explained in Chapter 3, a collaborative structure is already inherent in material aspects of the World Wide Web. Furthermore, the underlying design of Web 2.0 has been described as an "architecture of participation" (O'Reilly 2005), a term that clearly points to an understanding of participation generated by design options rather than community spirit. This is not new to the so-called Web 2.0, but has become very much evident in many of its most common uses, such as file-sharing.

Peer-to-Peer (P2P) file-sharing systems thrive on implicit participation in that they provide designs that require each participant to contribute processing power and storage space. The development of file-sharing technologies evolved from sharing music and video files and stimulated developers to build technologies that would be able to handle the up- and downloading of ever-growing file

formats. This design improvement enabled the speed of downloading files to increase. Although file-sharing services like *Napster* have been too hastily perceived as P2P communities, the strength of P2P actually lies in reducing the need for mutual social relations and community-based organization. Napster showed how user activities can be perfectly implemented into software design, so that they become easy to perform and even automatized. Simultaneously, the P2P application provides an interface that connects users and their stored files with other users' search requests without requiring them to communicate. These systems offer a platform for a large number of users who benefit from better search results and performance when more users participate. As opposed to community-based organization, where software applications support user communication and collaboration, software design constitutes the crucial and central aspect of socio-technical ecosystems. While individual participation is the key factor in communities, in socio-technical ecosystems the plurality of users is the more significant factor.

When using a P2P file-sharing system, users are not just taking part in the explicit act of file-sharing by downloading or uploading, they are implicitly contributing with their hardware and processing power to the system-wide infrastructure. As the sharing of hardware is a default setting in P2P file-sharing systems for participation, web-based information management services implement participatory media practices into their technical design by channeling user activities though the Graphical User Interface. This started with the easy-to-use interfaces of weblog software, which facilitated methods of setting up, filling and maintaining websites, and continued in Web 2.0 applications, where users can insert content from different locations, and information from various databases, in new applications.

The different domains of user participation referred to as a*ccumulation*, c*onstruction*, and a*rchiving* often merge in Web 2.0 applications.[232] The so-

[232] The underlying technology of Asynchronous Javascript and XML (AJAX), which is the core feature of

called Web 2.0 applications provide even unskilled users with an opportunity to connect databases, synchronize various data streams into one or more applications, and publish and edit content online (O'Reilly 2005). Described by O'Reilly as "harnessing collective intelligence" Application Programming Interfaces (APIs) enable users to connect various applications and sources and use them for different purposes. Instead of keeping data closed and hidden in a database no one may access, service providers share their information through the API. Sharing information and offering as many possibilities for third parties, whether they be officially licensed partners or just creative kids, has been recognized as an easy way of expanding business opportunities. In fact the mostly misguided celebration of what is perceived as the openness of application programming interfaces is actually just another way of controlling data.[233]

Another aspect of implicit participation is the sheer pragmatism of handling large numbers of users. Instead of administrating requests for advertising, Google assigns, with its *Adsense* service, the labor to the users who can freely install it on their websites. Users advertising via this service can do so by means of a handy interface. The information management system then delivers ads to the appropriate websites connected to the Adsense database (O'Reilly 2005). Just as Cisco Systems significantly changed the means of dealing with customers through a web-based catalog and electronic order system, Google built interfaces enabling all users to advertise their products through Google Adsense or

web design known as Web 2.0, in fact turns web sites into dynamic applications rather than just displaying a HTML site. This technology enhances interactive web-based applications and allows continuous reloading of data without having to refresh the entire website. It increases the speed and functionality of websites and enables complex interactions to take place between users adding or changing data, as well as interoperability between various databases streaming data to the web application.

233 Manovich has identified the database as a key aspect of the so-called new media (2001:218), and he emphasizes its effect on creating media texts. In relation to the Web 2.0 this line of reasoning becomes very much evident in the creation of MashUp websites. But in addition the database forms complex constellations with an indefinite number of other databases. It raises questions of data integrity, control of personal data and privacy and it should raise attention for the unstoppable fluidity of data streams.

place adverts on their websites. While Cisco Systems and many other companies share databases with licensed suppliers and identified clients, Google simply opened theirs up to everybody by providing an appropriate API. This approach is just another formalization of user requests and service provider responses, but fewer personnel are needed for communication and administration, and it is open to anybody without prior subscription or contact with the service provider. Although many Internet technologies display features of implemented user participation, as is evident from hypertext, peer-to-peer distribution, and distributed computing, the so-called Web 2.0 is perceived as a significant shift towards the integration of user activities into new business models. The beneficial effects of a network of users can be incorporated into software design, something referred to by O'Reilly as the *architecture of participation*. O'Reilly also anticipates that taking easy-to-use interfaces can lead to commercially successful applications that take advantage of user activities (2005).

Principles of this architecture are Application Programming Interfaces (APIs) for the synchronization of databases, the use of free text meta-data that can be added by users, possibilities to create, publish, and share all kinds of content, and a general interoperability that allows users to integrate the content into different websites or applications. The significant value provided by users is often described as user-generated content. Providers such as Flickr, Del.icio.us, MySpace, or Facebook are moving away from a culture industry concept of providing content to the construction of platforms and information management systems where content will be generated, stored, organized, shared, and expanded by users. The increased visibility and efficiency of user activities, as well as the huge numbers of individuals using these so-called Web 2.0 applications, is leading to an understanding of a new generation of web tools that are explicitly aimed at user participation and offer a *default* design for their use (Uricchio 2007). Ciborra has pointed out the importance of user participation in information management systems, emphasizing the need for easy-to-use,

adaptable, and hackable technologies that allow users to tinker with them and modify them (Ciborra 2002). Software design is being employed to channel social interaction and the participatory labor of users. Providing access to data through APIs led to the emergence of so-called *MashUps*, which can be described as a collage of various websites and databases. A prime example is *Google Maps*, which provides geographical data, images, and maps in different resolutions of almost every conceivable geographical location. Users can access these data through the API and route them to their own websites and applications. Available tools include easy-to-use *MashUp editors* that provide a web interface where users can relate the different sources and apply their individual filter settings with a simple drag-and-drop method.[234] A commercial project such as *Plazes* integrates network addresses with users to a geographical location on Google Maps.[235] The website *Flightwait* combines data from American airports and a map of the United States on flight schedules to show delays in real time.[236] *Flickrvision* shows the upload of pictures to the Flickr database in real time and relates them to the geographical location of the uploading user.[237]

Aside from the creation of MashUp sites that rather qualify for explicit production, the most profitable user generated content is in fact data. These data might be personal information users add to their profile pages in so called Social Networking Sites, their communication routed over the e-mail and messaging services, or merely the information how many users are watching which video. Every click will be tracked and log files assemble user data

[234] MashUp editors are Yahoo Pipes <www.http://pipes.yahoo.com>; Dapper, <http://www.dapper.net>; QuedWiki, <http://services.alphaworks.ibm.com/qedwiki>.

[235] Plazes: <www.plazes.com>; there are several similar projects, e.g. Bliin <http://bliin.com/> using not only the network addresses but also GPS data provided through smartphones.

[236] Flightwait: <www.flightwait.com>.

[237] Flickrvision: <www.flickrvision.com>

according to profiles and stored content. Users can rate content, indicate inappropriate postings, and participate in the indexing of the vast amount of data. Information organization becomes a key function of the information architecture in the so-called Web 2.0. When posting content to websites users contribute to the information management system by adding title, descriptions or comments. In view of these technologies participation has to be differentiated in terms of the voluntary production provided in user communities as well as by commercial third party developers, and the incidental and hybrid participation of large numbers of users in combination with information technologies. While the explicit participatory culture of fans, activists and prosumers has been described as the labor of enthusiast communities that often might inherit critical connotations or aspects of a new folk culture (Jenkins 2006b:132), or which might appear as a subculture phenomenon, participation in Web 2.0 occures as an implicit aspect of clever software design. It is achieved by designing information management systems and their graphical user interfaces in a way that subtly channels user actions.

Managing information and social interaction

Websites such as Del.icio.us and Flickr.com have become extremely popular and are often used as prime examples of the so-called Web 2.0. Their aim is to achieve information management through a large number of users, and can be seen as typical socio-technical ecosystems. Noticeable in these systems are the different layers of social interaction and the use of *meta-information*, that is information about information, for organizing stored content. Process tags are used to improve semantically correct information retrieval. Tags are free text meta-data that can be attached to any content stored online. The best analogy is to that of a *Post-it* describing the object to which it is attached.[238] A tag could

[238] The concept of organizing information by classifying, attaching, and organizing meta-information

be any keyword, such as the title of a song, that is stored in an audio file, or the title or the description of a picture, website, or a movie file. The words used as tags can be chosen by the user independently of any formal classification or regulated terminology. Tagging differs in this respect from any classification or taxonomy. It is just a form of meta-information that is organized by the semantic structuring process of the information management system (Hammond et al. 2005a, 2005b). Users' freedom to choose whatever text they like has led to tagging being labeled as *social bookmarking*, emphasizing a collective production of so-called *folksonomies.* The term *folksonomy* stands for user-generated taxonomy, although the contribution of free text meta-data is in fact neither a taxonomy nor is it a classification or an ontology (Golder; Huberman 2005). *Social bookmarking* and *folksonomy* are perceived in popular discourse as yet another example of the social progress and "democratizing" effect of the Web 2.0.[239] The social aspect of tagging is reflected in the number of users contributing to the information management system, simultaneously constructing an efficient semantic organization of content. The expectation is that users adding keywords to files and websites stored online will improve the accuracy of retrieved information.

The problem generally associated with information retrieval has been clearly articulated by Winograd and Flores:

> If the problem is narrowly construed as 'Find a book, given specific information' then the system may be good. If we put it into a larger context of 'Find writings relevant to what you want to do' it may well not be, since relevance cannot be formalized that easily. (Winograd, Flores, 1986:167).

goes back to the work of Melvil Dewey, inventor of the *Dewey Decimal Classification* for organizing books in libraries in 1876, and the work of information science pioneer Pault Otlet and his attempt to organize the world's accumulated knowledge in an archive that he conceived as *Mundaneum* in 1910.

[239] This expectation is formulated in rather utopian terms by Clay Shirky: Ontology is overrated, categories, links and tags, *Shirky.com*, <http://www.shirky.com/writings/ontology_overrated.html>.

The problem, in other words, results from the inability of machines to understand the semantic content of files. It has been suggested in the W3 standards to create and attach machine-readable meta-information to files stored online. Unfortunately a large part of online content lacks these very meta-data, or the person who configured the meta-information is using terms unknown or inappropriate to those searching. Free text tagging provides two promising perspectives for information organization on the Internet: Firstly, it describes the semantics of files stored online as a "Post-it" added to a website, a photo, a movie file etc.; secondly, it is realized as a flexible technology, not dependent on a hierarchical classification of fixed terms, and not limited to specially skilled or authorized users who are able to add and change meta-information. Every possible term can be used as a tag. Furthermore, meta-information is not exclusive or static; other users can add information, hence the files can be described in several ways, and can be labeled with different keywords. Search engines cannot read and identify all files. Movie and audio files, pictures and many websites, cannot be read by search engines and can only be identified if machine-readable data describe the content. So what tags do very well is to compensate for the semantic limitations of information technology, because the free text meta-data can be read by machines and are useful for users as well, because users can attach any keyword to the file in question. Users are free to act without the restrictions of regulations and the limitations of classification systems and taxonomies. The use of free text keywords directly stimulates large user numbers to add any keywords to improve their own information retrieval or the visibility of the content they store online. But it also generates a plurality of input that can be used for automated information management.

Often such tags are represented in the form of a *tag cloud,* usually as an alphabetical listing of the keywords (tags) used in a given information management system, such as Flickr, or Del.icio.us, but also on weblogs for a quick navigation to postings related to the keywords represented. The size of the letters

indicates how frequently the tag was assigned to stored content (see fig. 12). The tag cloud became an emblematic icon of Web 2.0 and can be found as a representation of related keywords on any Flickr and Del.icio.us user account. Many other websites use the tag cloud to offer a quick overview of frequently used keywords and a way of navigating to entries featuring those keywords. However, the practice of 'quick-and-dirty' tagging made the representation of keywords in a tagcloud less attractive. Redundancy of keywords provided rather boring results.[240] On these websites, each of the keywords is a a hyperlink linking up with the collection of data using this specific keyword. Tags become a way of navigating through stored data and connecting to stored files. They furthermore construct semantic "neighborhoods" of the stored files and users.

Fig. 12, Tag cloud of keywords used on the BoingBoing weblog, retrieved from Technorati.com

Participation and the collective generation of content is facilitated by implementing an interface design that stimulates users to provide tags to the files they

[240] See Smashing Magazine: *Tag clouds gallery. Examples and good practices*, November 7 2007, <http://www.smashingmagazine.com/2007/11/07/tag-clouds-gallery-examples-and-good-practices>.

upload. The interface also may enable social interaction between users but does not rely on it. Social interaction becomes only one of many options. The overall system is not dependent on the extrinsic and explicit participation of individual users, but on a plurality of users contributing to the system by simply using it. The labor generated on the platforms reflects the hybrid interaction of a plurality of users and the software bound together in a socio-technical ecosystem.

How participation takes place on an implicit level will be briefly illustrated by considering Flickr and Del.icio.us, which are prime examples of information management in Web 2.0 applications and qualify as representative examples of the phenomenon of non-intrinsic and non-explicit participation. They furthermore demonstrate how users and technologies act interdependently in a socio-technical ecosystem. The implicit participation engaged in by users of these sites requires us to review what has been described as explicit participation, namely the terms of community, the social network, and motivation.

Flickr is a popular photo website ranked 30 on the Alexa Global 500 (September 2007) and provides space for storing, sharing, and commenting on photographs online.[241] Each user account consists of a photo album that can be organized into different sets, a contact list, and a list of groups the user is subscribed to, and a list of the user's favorite photos taken by other users. Users can add any other user to their contact list, as they can add any other user's pictures to their list of favorites. The social network is therefore not necessarily reciprocal. Social contacts can be divided into *family*, *friends* and *contacts*, and different privacy settings for stored pictures can be designated to each of these profiles. Users can also join and found *groups* on Flickr. These groups revolve around all kinds of topics and can consist of as few as one or two members or

[241] The Flickr <www.flickr.com> application is an accidental spin-off of an online game community and became a fast-growing and successful platform for sharing photos. It was bought by Yahoo in March 2005. As of August 2007, a billion photos were stored on Flickr.

as many as several thousand members. When uploading photos to Flickr, users can easily add meta-data and attach a title, description, and several tags (keywords) to each picture. By providing this information, users contribute to the system-wide database where the tags and all other added information, such as titles, descriptions, and comments is accordingly organized by semantic structuring processes. For example, if a user uploads a picture of the *Eiffel Tower* in Paris she might add "Eiffel Tower" as a title, and "Paris" as a additional tag, or she might add "sunset", "clouds" or "night" or "summer vacation 2007", depending on the situation the picture represents. She could even attach the geographical data of the location to the picture through an interfacing connection with Google Maps, that allows Flickr users to drag the photos onto the location of a map where the picture was originally taken: the system will then add the geographical data to the picture.

The information management system will organize a photo according to the tags. The more pictures and information are added, the better the system organizes them semantically. As a result, personal tags, such as "summer vacation 2007" or something like "Jeff's birthday party" will not affect search requests that are not directly aimed at these topics. Many photos labeled as "Paris", "Eiffel Tower", "Night" will form a cluster most likely consisting only of night shots of the famous building. And unnoticed by most users, data are already contributed through the Exchangeable Image File (EFIX) data. These data are meta-data attached to each image taken with a digital photo camera and contain, among other kinds of information, a record of the camera model, date, time, and camera settings. These data can be used for extensive statistical analysis of camera use, the popularity of the models used, and the amount of photos shot with the different cameras.[242] Users generate even more data by viewing other users' pictures. Subscribers with a paid account can retrieve these

[242] The Flickr camera statistics can be retrieved at: <http://flickr.com/cameras/brands>.

data on a daily basis.[243] On a system-wide level, all this information is used to improve search results. Through an interfacing connection to the Yahoo Search engine, the meta-data of pictures are used to respond to picture search requests. Here the labor of users is leveraged to the benefit of the companies providing the service of the photo-sharing platform, and collective labor is constituted by means of implicit participation. Many features are automated, such as the transferring of EFIX data, while others are implemented into the interface design as part of the tagging options. Being a side effect of user activities performed on such an information management system, the resulting labor is of course used without any acknowledgment for their having improved commercial services.

Although Flickr does provide examples of communities and tight social networks, the important distinction to be made here is that participation takes place accidentally by simply uploading pictures and adding a title or tag to it, which is not necessarily caused by an intrinsic motivation to improve search requests. It cannot be denied that there is an important motivation the Flickr design takes advantage of, namely the potential amount of views their pictures might receive. Users think of ways to tag their pictures as effectively as possible in order to attract a large number of views. This can be also seen as a motivation for joining a group dedicated to a certain topic. The more groups a photo is posted to the more views one receives. Several groups introduced rules saying that they only accept pictures not exceeding a certain limit of group posts. However, the motive of receiving attention might also be mentioned as crucial for users who modify electronic consumer goods, but it would not sufficiently account for the amount of labor accomplished in those user communities, nor

[243] The *Vidmeter* website is an example of the representation of data indicating the viewing numbers of the most popular videos on YouTube and Google Video. Through Application Programming Interfaces from the mentioned websites the videos, as well as viewing numbers, are routed to the Vidmeter website generating the internet's top-hundred list of popular videos: <http://top100.vidmeter.com>.

would it sufficiently account for the amount of photos stored at Flickr and the meta-information added to them. The difference between a community developing a modification for a computer game or a fan culture platform and a massive multi-user information management system is that in the latter case a large number of users make comparably small contributions, such as adding meta-information, and the way in which these interact with the software design. As opposed to the communities in software development, gaming, modding, or fan culture the participation in massive, multi-user information management systems is not rooted in a common interest for a given subject, neither does it require the intrinsic motivation of individual users to expand a given cultural resource the will to or contribute to something.

The information management system *Del.icio.us* displays features similar to *Flickr's*, but it is even less dependent on social interaction. Del.icio.us is a popular website for storing one's favorite web bookmarks, that is web addresses of websites (URLs). Users browsing the World Wide Web can post all websites they want to bookmark to their Del.icio.us account. While adding a link, users attach meta-information in the form of tags as well, mostly choosing keywords they associate with the website in question. If other users have already bookmarked that site in question, the information management system suggests keywords other users have used as appropriate tags. The Flickr.com website, for instance, has been posted to Del.icio.us by over 41,000 users who tagged it mainly as "flickr", "tools", "photo", "photos", and "sharing".[244] When adding a new URL, the system already suggests tags based on tags that were attached to the same website by other users. Again, users are participating in the creation of an information infrastructure just by storing content online that is furnished with meta-data. Users and the stored URLs form clusters and paths for navigation. Looking up an URL on Del.icio.us leads to a collection of URLs of the

[244] The URL www.flickr.com has been saved by 41,221 users (February 19 2008), <http://del.icio.us/url/fed5c26047551a2705952dbe9912fc57>.

individual users who have already added that URL to their individual bookmark collections. The relation between the individual user, the plurality of all users, and the information system can be easily recognized in the Del.icio.us tagcloud, as displayed in fig. 13. The tag cloud represents the most frequently used keywords, and highlights the keywords the individual user is sharing with other users. By clicking on a tag, a hyperlink refers you to a chronological list of stored websites that are labeled accordingly, and another list shows the most active users contributing to the keyword in question. Although it is possible to use "social" features in Del.icio.us, such as establishing a personal network with other users and recommending posted websites to them, or looking up their bookmark selections, the social interaction is even more fragile than in the case of Flickr and less cohesive as well. Users cannot prevent others from adding them to their network, but they can refuse a mutual connection.

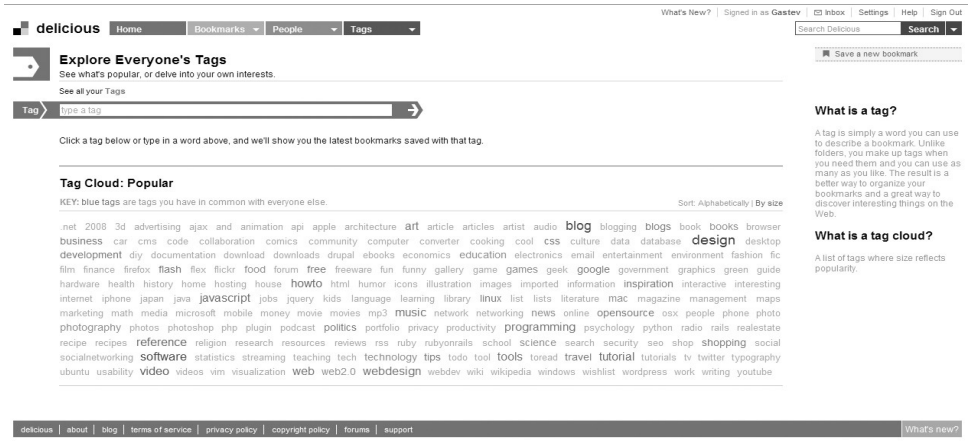

Fig. 13, Screenshot displaying popular tags on Del.icio.us

Again, the meta-information provided by the plurality of Del.icio.us users creates ways of navigating, and by clicking on the keywords a user added to the posted websites, they will find not only their own postings but those of all users

using the keyword in question, and it is subsequently possible to browse the bookmark lists of other users and find related links. Participation is again taking place at an implicit level that does not require any identification with a community, product, or activity, rather it serves pragmatic features, such as achieving better search results. The effectiveness of the overall information system is determined by the number users adding meta-information to it, the software design channeling the user actions and organizing the input information, and yet also by the graphical user interface that encourages easy and intuitive use. But Del.icio.us offers us more than just a system for storing bookmarks online, since it relates the bookmarks with the collections of similar tags and users storing bookmarks accordingly. This enables users to find other websites through the semantic clustering that allocates them around keywords and users. Without mutual communication, users can benefit from their various collections of links.

The features of implicit participation make particular sense in the area of archiving. Just as Napster was actually a system for organizing information and creating an index file of locations available for downloading, many Web 2.0 applications are "engines" for effective information management, unfolding in user activities and automated information processing.

These examples show a different quality of participation. Here, participation takes place incidentally, but is nevertheless a contribution to a form of cultural production, namely the construction of information resources and ways of navigating through them. While explicit participation showed how heterogeneous the activities, motivations, practices, and objectives are, implicit participation reveals that the media practice is extremely hybrid, consisting of interactions between users and technologies. It furthermore shows that aspects of participation can be automated and integrated as design features into information management systems, allowing participants to perform activities without the need for social interaction, and even allowing the providers of a

system to benefit from user activities without acknowledging their contribution. The design of these technologies can be set up to stimulate certain activities and stifle others, and, as will be discussed in Chapter 5, this objective can be seen as an attempt to implement user activities into certain business models or to enable users to achieve certain skills and qualities.

Floating archives

The large libraries and information storages Otlet, Bush, Nelson and Licklider were proposing a somehow anarchic form of floating archive online. Generally, the Internet and WWW provide the a means for publishing content different from conventional archiving. However, collecting, distributing, and maintaining data constitutes "floating archives". The media practice referred to as as *archiving* in Section 2.2 reveals a notable convergence of explicit participation and implicit participation. This media practice indicates a rather heterogeneous, if not anarchistic, or coincidental way of organizing and storing information online. What traditionally was perceived as an archive, namely a local storage of artifacts determined by a filing system, an input control, and policies for maintenance and access, is challenged by the new technologies. Now user participation has become a crucial aspect in creating data collections, filing, maintaining, and processing information. While traditional archives were maintained by professionals and were subject to regulations stating what is worth preserving and in which categories it should be filed, floating archives are more like a dumping space for all kinds of files.

Unlike "analog" archiving, the storing of information in digital media is not determined by storage space. The ever-increasing capacities of data storage devices and the decreasing costs of storage space lead to a media practice that has been characterized by Lev Manovich as the "post-compression condition"

(2005).[245] Manovich claims that unlimited storage capacities also profoundly affect the production of art. While art in previous centuries was forced to compress reality and represent, for instance, entire narratives in one single painting, the post-compression condition even allows the real-time archiving of events and preservation of unlimited quantities of information in databases (Manovich 2005). What Manovich calls the post-compression condition is characterized by an attitude of storing first, selecting later.[246] This process can even take place in real time.

A noteworthy project anticipating a media practice that comes close to real-time taping a user's life is Gordon Bell's *MyLifeBits* (Gemmel et al. 2002; Bell; Gemmel 2007). It aims to record an individual person's entire day, by capturing all kinds of information, from weather data to geographical location and pictures or movie files and sounds from the events of the person's day.[247] Made from common consumer electronic devices, the Australian media artist Nancy Mauro-Flude has built a bag, that serves as tool for recording images, sound

[245] Reference is the lecture Lev Manovich gave on November 15th 2005 at Piet Zwart Institute in Rotterdam (NL). Manovich kindly provided the author with the lecture notes.

[246] On the level of legal authority, the post-compression condition is evident in an unstoppable voracity to collect as much information on citizens' personal lives, their communication, travel data, biometric data, medical and employment history, social networks, and consumption behavior. The DARPA's Information Awareness Office (IOA) started the controversial *Total Information Awareness Program* to monitor as many citizens as possible and search the data with pattern recognition technologies for finding alleged terrorist activities. The project's data-collecting and data-mining would of course harm the privacy of all citizens, because it aims to store as much information about any given individual as possible and then filter it to define who is likely to fit the profile of whatever has been declared criminal.
Besides the socio-political issues of privacy and democracy, systems such as the TIA are challenged by the quality of data and interoperability which can mislead data-mining actions, see Seifert, Jeffrey W. (2004), Data mining and the search for security: Challenges for connecting the dots and databases, in Government Information Quarterly, Vol 21, Issue 4, 461-480.
For privacy concerns and security relevance see also Taipale, Kim (2003), Data Mining and domestic security. Connecting the dots to make sense of data, in Columbia Science and Technology Law Review, Vol. 5, No. 2, December 2003.

[247] The MyLifeBits project was developed at Microsoft Research by Gordon Bell, and is described on its website as "MyLifeBits is a lifetime store of everything. It is the fulfillment of Vannevar Bush's 1945 Memex vision including full-text search, text & audio annotations, and hyperlinks. There are two parts to MyLifeBits: an experiment in lifetime storage, and a software research effort." <http://research.microsoft.com/barc/mediapresence/MyLifeBits.aspx>.

and tracking geographical position data. Such a device can be either used for collecting records for a personal diary-like archive, but it can also be used as a tactical medium for grassroots journalism, and is therefore providing means for participation. Mauro-Fludes device is further more automatically scans its the environment for open WLAN access to transfer the recorded data to a remote server for archiving.[248] Projects like the Mauro-Flude's *Bag Lady 2.0* or Bell's MyLifeBits anticipate a media practice of perpetual recording and archiving in what Manovich calls a post-compression condition.

While traditional archives applied filtering before storing artifacts, filtering is now used to select from the vast amount of stored information those pieces which seem to be worthy to be used for further purposes. Due to the decreasing costs of storing information or even large files online, and due to the increasing possibilities of gathering and distributing all kinds of data, archiving became an almost pervasive media practice, wherein much of the labor is done by users, while commercial services seek opportunities to collect and exploit the collected information. Companies such as *Rapidshare*, *Megaupload*, and *Flyupload* offer cheap online storage capacities for large quantities of data. Others offer services for specific kinds of data, such as *Flickr* or Photobucket, which offer users a system for archiving photos, and *YouTube* for uploading videos. Nevertheless the emergence of these services indicates that storage and traffic do not come for free, and particularly when a certain scope is exceeded, they require large enterprises for funding, maintaining, and marketing those services. It demonstrates the extent to which participatory culture often spreads on corporate platforms. Beside commercial services, there are countless data collections in the domain of users.

The plurality of different formats, data carriers—either offline or online—and the Internet, with its hypertextual connected web servers, constitute a void filled

[248] *Bag Lady 2.0*, Nancy Mauro-Flude aka sister0, 2008. Project website, <http://sistero.org/baglady2_0/magic/index.php>

with data. The term archive might not be appropriate to describe the often unorganized, widely distributed, redundantly stored, coincidentally filed, and often not systematically indexed information. The archival chaos began with the challenge of preserving earlier generations' artifacts. Just as nitrate film required copying on more durable film, or acidic paper often leads to reprinting books on acid-free paper, the basic format of data carriers in the digital age has changed as well. The digital heritage is divided into many different formats, machines, operating systems and file systems. Storing data in one format does not guarantee durable archiving. Many programs that can be run on outdated computers or video game consoles would not be accessible anymore if users or companies didn't reformat them to work on current gaming devices. Many classic computer games are available with so-called emulators, software that emulates the original machine on a current device. The format data are stored in, and the devices they are stored on, are changing faster than the archival process itself. But in general data on digital devices do not disappear over time, as is the case with acid paper or nitrate film, but require an active or accidental deletion process. Along with the plurality of allocated data on the most different of machines, data carriers or online databases, data collections are heterogeneous in their indexing system, their meta-information, and their relation to retrieval and search technologies. While the established archive has been an institutional setting with a curating policy, a coherent filing system, and durable maintenance, the data collections on the Internet can be accumulated and often accessed by anyone.

In an attempt to categorize the many different kinds of existing archival systems or information management practices, the following forms can be distinguished: organized archiving, personal archiving, and massive archiving. Each category describes different layers of participation. The interrelated dynamic of users and information technology is explicitly visible in user activities aimed at organizing information. This activity is heterogeneous also with respect to professional

organizations maintaining archives or communities and individual users who employ information technology to provide data collections and access. In the case of web-based applications, personal archiving is an explicit activity performed on a platform that exploits it simultaneously as implicit participation. Massive archiving, on the other hand, describes automated processes of archiving and a high degree of implicit participation.

Organized archiving

Organized data collections maintained according to curatorial guidelines, filing systems, and systems of information management and retrieval are those that most resemble established analog archives. These data collections do not need official or institutional approval and can be constructed by any user as long as storage and traffic capacities are provided. Often, users can add further data to a collection. Noteworthy examples are *Internet Archive*, *Scene.org*, and the *Project Gutenberg*. The Internet Archive's *Wayback Machine* provides documentation of websites back to the year 1996 and carries out regular web crawls to archive a global snapshot of websites. Furthermore, the Internet Archive hosts a collection of movies that are in public domain, as well as an audio and text collection.[249] As Uricchio emphasizes, this archive is crucial for providing access to the first decade of the World Wide Web through systematically preserving the dynamic, constantly changing, and unstable media technology (2009). Scene.org is an archive for audio files and demoscene files, facilitating daily traffic of up to 200 gigabytes.[250] It is an example

[249] The Internet Archive, founded in 1996, consists of the Wayback Machine, and a collection of audio, text, and movie files. The archive exceeds 2 petabytes and grows by 20 terabytes per month. The entire archive is mirrored, that means stored redundantly on a different sever, by the *Bibliotheca Alexandrina* in Egypt. <www.archive.org>.

[250] Scene.org is a non-profit organization mainly sponsored by the animation studio *Pixar*, the Austrian Internet platform for computer hardware prices *Geizhals*, the Rotterdam University of Professional Education, and the Dutch computer game studio *Guerilla Games*. The stored data are redundantly stored on several mirrors.

of a community-based archive, preserving and maintaining the creations of a fragmented part of digital culture.

Project Gutenberg is one of the oldest digital archives attempting to provide access to public-domain books. Supported by thousands of volunteers, books are scanned and made available in plain text and HTML, totaling over 20,000 freely, accessible books.[251] As opposed to the information management implemented in sites such as Flickr.com, Project Gutenberg primarily thrives on explicit participation and a selected group of persons responsible for maintaining and organizing the archive, as does Scene.org. However, the Wayback Machine is an approach to archiving that implements participation and automates it (Rogers 2004:14). The websites indexed in the Wayback Machine are indexed through a PlugIn users may add to their browser. After this initial explicit act, the collection of data is delegated and websites will be reported automatically to the Wayback Machine.[252]

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[251] Project Gutenberg was founded in 1971 by Micheal Hart and operates as a non-profit organization, <www.gutenberg.org>.
Affiliated projects continue to provide access to public-domain books in different languages, such as the German Projekt Gutenberg <http://gutenberg.spiegel.de/>, hosted by the weekly magazine *Der Spiegel*, the Project Gutenberg of the Philippines, focusing on national literature, or Project Gutenberg Australia, which benefits from differences in copyright law between the USA and Australia and is therefore able to publish books that are not yet in public domain in the USA. See also Michael Hart. 1992. Gutenberg: The history and philosophy of Project Gutenberg, *Gutenberg.org*, <http://www.gutenberg.org/wiki/Gutenberg:The_History_and_Philosophy_of_Project_Gutenberg_by_Michael_Hart>.

[252] The Alexa Internet generates its web traffic statistics in a similar way. People can download a PlugIn or a toolbar for their browsers (by default only for the Internet Explorer, third parties offer tools for Mozilla Firefox and Safari) that reports visited sites back. Alexa Internet estimates the projected web traffic using these data. The tool can only provide an indication of user statistics, since it cannot be accurate: The toolbar gathers data from people who voluntarily installed it, and does not compute a representative sample; it furthermore is confined to the activities of those using Internet Explorer. It might be also disincentive to potential users that several anti virus programs report the Alexa toolbar as spyware..

Personal archiving

Along with the large organized data collections that are most often stored on servers, archiving online includes personal data collections that can either be stored on servers (web-based) and/or on clients (on the user's PC).

The most simple examples are e-mail archiving applications or software for organizing music, video and text files, or hyperlinks.[253] Basically the archiving application helps users create an index that enables fast retrieval of all kinds of data that might be stored somewhere on the user's hard drive or online. Index and content can be separated and are related to each other through hyperlinks. Commercial Web 2.0 services, such as *Flickr* and *Photobucket*, provide users with storage capacities and useful tools for information retrieval. Del.icio.us is users can add information and tags to the websites they store in a personalized structure and relate them to the entirety of stored web sites in the information system. This activity may only serve the user's personal need for information management, but the user can also share stored information with other people. However, regardless of the users' motivations, they do, by the same token, participate implicitly in improving the system-wide database. The more users add information to the system, the better the overall information system becomes in terms of information management and retrieval. Despite the fact that users archive their own personal files, their activities exceed the scope of personal information management and affects the system-wide platform.

[253] An example of a personal archiving tool is *Zotero,* a client-based tool enabling the archiving of visited websites and stored files. It works as a Firefox PlugIn and is even able to grab certain types of information, such as bibliographical notes from library websites and online bookstores, and reproduce them according to different academic annotation styles. By adding tags to each item, users can organize their personal archive according to association and various topics rather than following a hierarchical filing system.

Massive archiving

The most striking aspect about storing files online is massive participation (Uricchio 2004a; 2009). Through distributed computing, processing power and bandwidth can be shared, facilitating the distribution of even large files. An initial download of a program automates these processes, making it necessary to connect the user to a file-sharing network. The use of such an application indicates how explicit and implicit participation blurs into each other.[254] While users on Flickr, YouTube, or other Web 2.0 platforms often don't see to what extent they implicitly participate in creating value, users of file-sharing systems are often aware that they explicitly share a part of their hardware and processing power. A prime example of explicit participation in distributed computing is the SETI@home browser, where users can "donate" their computer's idle time to process signal analyses of recorded data.[255] In file-sharing networks, users also participate at this technical level by contributing processing power and storage capacity to the overall network, but they also participate at a content level by uploading files for sharing. The boundary between explicit and implicit participation blurs in these examples, as does the boundary between user-driven and machine-facilitated participation. Posting movie files on the Internet Archive's database or on YouTube is a conscious and explicit process, while adding tags, viewing clips on YouTube, commenting, rating, etc., consti-

[254] The phenomenon has been also described as *voluntaristic* and *non-voluntaristic* inclusion. Rogers emphasizes the blurring between voluntaristic participation and non-voluntaristic participation, a fine line that cannot always be drawn accurately (Rogers 2003:15). He explicitly refers to the indexing of Google as a non-voluntaristic approach, because the Google crawler affects most content without explicit "permission", while an open directory relies on voluntary contributions. The fine line between voluntaristic and non-voluntaristic is evident in the Alexa PlugIn and the Wayback Machine index, which rely on users to download a PlugIn to report back visited websites.

[255] Another project would be Folding@home, currently the most extensively distributed computing project, where the idle time of computers is used for simulations of protein -folding. Sony features the Folding@home client on its recent game console Playstation 3. In January 2008, one million PS3 consoles contributing to the project accumulated estimated 74% of the overall performance, although the consoles' processing power could not been fully exploited due to technical problems. See weblog Folding@home: <http://folding.typepad.com/news/2008/02/ps-issues-updat.html>.

tutes, at least at some level, also an implicit participation in information management. When participating in a file-sharing network, parts of the hardware are implicitly used for extending the network's distribution quality.

Technologies such as P2P file-sharing thrives on the participation of a large user numbers. The more people participate in a peer-to-peer file-sharing network, the more files become available and the faster the distribution. For services such as YouTube, Flickr, MySpace, and Facebook, which are all in the top-ten of Alexa's web traffic statistics, large user numbers have a similar effect. The more people store and tag their photos on Flickr, the more accurately the search can cluster and retrieve photos according to search requests.

This kind of archiving also differs from a conventional understanding of archiving in that the stored data and the index or referring meta-data do not need to be stored together. Through hypertext, users can navigate from an index directly to the stored data. The separation of storage and index is a feature widely exploited in peer-to-peer file-sharing systems. P2P file-sharing systems are mainly distinguished by their being either centralized and decentralized. The Napster file-sharing system employed a central server hosting the index of all available files. Decentralized systems, such as *Gnutella* or *eMule*, resort to a choice of available files generated in real time from available nodes and therefore do not represent the overall availability of files. In both cases, index and actual files are separated and only hyperlinks refer from index to file. The index may represent all features of an organized archive, but the related data can be stored on many different locations. File-sharing systems facilitate the separation of index and content. The BitTorrent protocol used for P2P file-sharing formalizes the separation of index and stored file. A *Torrent* file refers to a certain file, e.g. a movie. Once downloaded to a user's computer and opened in a BitTorrent client, the Torrent file connects to an index of other users where the requested file is available, and starts downloading pieces of it until comple-

tion. The BitTorrent protocol enables faster distribution of files, exploiting characteristics of mass archiving. The more often a file is downloaded by users and stored redundantly, the faster the file can be distributed. Storing files, as well as the creation of indexes, open many possibilities for user participation.

Countless user websites publish links to files stored on share-hosting services, such as Rapidshare and Megaupload. These commercial services are therefore enriched by user activities, searching the contents and publishing hyperlinks to stored files. Similarly, BitTorrent files are published on countless websites, relating media files to a Torrent file, which can facilitate the distribution of the advertised media file. One of the most famous search engines that indexes from peer-to-peer filed data is *The Pirate Bay*. This controversial web platform operates under constant legal threat from various associations in the film industry. It is an oft-repeated accusation made by the music industry that file-sharing systems are used for illegal purposes only, but in fact they offer a legal way to cut costs on traffic expenses. Several copyright owners and other services deliberately use these systems to distribute their content and avoid hosting files on their own servers and spending money on traffic.[256] They take advantage of a plurality of users hosting their files and participating in circulating them through file-sharing networks.

Napster, the first P2P application, has already demonstrated how little social interaction is required for participating in a socio-technical ecosystem. Automating several processes in the search for indexed files, and their distribution through the connected computers, delegates many processes of sharing files to an application, and lowers the bar for participation. Users participate implicitly, sharing parts of their hardware by default; and they participate explic-

[256] E.g. the online mini-series *The Scene*, revolving around a *release group* that rips and publishes DVDs on the Internet, is not only offered as a download on its website in various formats, but is also available as a BitTorrent file. The series' story and style, and its distribution, targeted an audience that was familiar with the use of P2P file-sharing systems and aware of its socio-political issues: <http://www.welcometothescene.com>.

itly by contributing files to the collectively shared resources, or by generating websites that refer to stored files. The media practice of archiving is a crucial extension of the existing cultural resources and is fundamentally transforming the availability and accessibility of media texts. Here, the explicit participation of users is important for collecting and digitizing artifacts, and making them available online.[257]

The media practice of archiving reveals socio-technical ecosystems of interacting information technology and massive user numbers.[258] A great deal of the distribution work is delegated to machines, while it is often the activities of explicit users that provides the content and related information. Similar to the information management systems mentioned above, P2P file-sharing systems are also socio-technical ecosystems thriving on large user numbers and constituting a platform for performing search requests and file distribution accomplished by an interaction of large user numbers with information systems. The easier and the more automated these interactions become, e.g. through easy-to-use interfaces and automation, the more popular and more efficient those services can become as well. It has to be emphasized that the dispositif of participation is affected by the hybrid interactions between users and technologies, both of which are subject to (popular and scholarly) discourses as well as the result of design decisions (such as affordances) that are, yet again, produced discursively and through other user-technology interactions (appropriation and design).

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[257] The *Internet Archive* is stimulating this by providing a manual on how to digitize an LP, which is a process of transforming information stored on a vinyl data carrier into a digital format. Internet Archive: How to digitize a LP, June 19 2008, <http://Internetarchive.wordpress.com/2008/06/19/how-to-digitize-a-lp>.

[258] A political component is added by the controversy about file-sharing by piracy and the alleged revenue losses in the music, movie and software industries. Indeed,the society-wide debate leads to explicit participation in the form of media campaigning against the legal actions undertaken by copyright holders and their representatives. Section 5.1 will discuss this as a mode of confrontation, which is typical of the extension of the cultural industries, where established business models are challenged by new technologies.

Hybrid participation

In the present research, participation has thus far been distinguished as either explicit and implicit participation. Explicit participation reflects conscious, voluntary, often intrinsically motivated activities; it is often community-driven, based on mutual social relations and communication. Implicit participation, on the other hand, depends on the formalization of user activities as default functions in the technological design. It has been described as heterogeneous with respect to its various participants and their social context and role either in user communities, corporate businesses, or political groups and the blurred boundaries in between these. It is also heterogeneous with respect to users' motivations and mindsets. By implementing user activities as default options into software design, participation can be perceived as a hybrid interaction of information technologies and users. Of course, hybrids of human and non-human actors can be recognized in many dispositifs, but it has to be emphasized that taking the aspect of hybrid interaction into account transforms the understanding of participation.

Human capacity for action becomes intrinsically related to information technology. But instead of perceiving the technology in a McLuhanian way as a cause shaping a participatory culture, it rather emphasizes design choices made by designers and business leaders to formalize user activities in an interface design and the application's back-end. Despite the fact that interactions between humans and non-humans are evident from the descriptions in the many examples above, the quality of user activities implemented into an application's graphical user interface design and back-end has a different quality. With reference to Katherine Hayles, implicit participation could be described as an emergence of complexity, constituted in the dynamic interaction of information technology and a plurality of users (Hayles 2007). Hayles notes that “differences in complexity notwithstanding, the human and computer are increasingly bound together in complex physical, psychological,

economic, and social formations" (Hayles 2007:101). In socio-technical ecosystems, this complexity seems to multiply. A multitude of users from the most divergent social contexts and networks are engaging with a plurality of software applications that are connected to many other computer networks, databases, other applications, and software agents. The technology is defined by an opaqueness resulting not only from graphical user interfaces, translating software processes into easy-to-use icons and simplified commands, but also through the general inaccessibility of many of the technologies used. Although users generate content, engage in social relations, mash websites and data streams, affect the visibility of posted articles by means of ratings and number of clicks, which is all computer-mediated and facilitated through software design, the machines operate on the "dark side" of the interfaces, and are too often neglected in discussions and critiques about user activities. Users might be aware of some of the routines performed by their e-mail program in order for them to receive and send e-mails, and users also have an understanding of the role technology plays in their daily activities when using a computer. But in the case of implicit participation the question has to be asked whether users are aware to what extent the software is using them?[259] The *Time* magazine article mentioned earlier demonstrates perfectly how the opaqueness of software hidden under glossy interfaces and praised by enthusiastic promoters emphasizes what users do, but neglects what the information machines do. While on the surface users still can perform explicit and even critical activities, the underlying structure uses these activities to improve information management and often serves commercial interests. The aspect of hybrid participation has to be emphasized, to point out the role of automated information management, data generation, and its synchronization with other mashed information systems.

[259] Micheal Wesch's short YouTube clip *Web 2.0... The Machine is Us/ing Us* (2007) demonstrates perfectly how users and software design are interrelated and interdependent: <www.youtube.com/watch?v=6gmP4nk0EOE>.

As has been shown above, these systems, whether Web 2.0 applications or systems of distributed computing, produce labor and deliver results. These results are neither man-made nor machine-produced, but are the outcome of a dynamic interaction between a plurality of users and artifacts. These hybrids appear in the most diverging contexts of contemporary Internet use. They facilitate complex distribution processes, such as P2P file-sharing, enable the accumulation of processing power, such as distributed computing projects, and improve information retrieval and semantic data clustering in information management platforms that are constructed as socio-technical ecosystems, where the plurality of users and the "realm of pure technology" (Hobart; Schiffman 2000) meet. Hobart and Schiffman describe as pure technology the almost inaccessible areas of technology, such as "search engines, agents, and algorithms" which in linguistic terms are determined by syntax rather than by semantics (Hobart; Schiffman 2000:204). Without changing the basic aspects of technology, free text meta-data and the interfaces stimulating and facilitating their use often compensate well for the lack of semantic information organization. Providing keywords or tags and other meta-information, users increase the overall potential for organizing and retrieving information efficiently. Furthermore, they affect the organization, display, and representation of stored content either by simply retrieving it or even more by explicitly rating, commenting on, or reporting it as inappropriate to the maintainers of the information management system. The participation is hybrid to the extent that the information management system and the plurality of its users construct and organize content together. Describing participation primarily as explicit activities by users neglects the agency of the software design that channels these activities. Releasing a software design immediately leads to interactions of an unknown plurality of users that will use, appropriate, and re-use the design in several ways, often in ways that are unknown or unexpected to the designers. However, many user activities can be structured and formalized in the information management

system's design and the user interface, and this is occurring more and more frequently, as the media practice of online culture and social interactions is better known today than a decade ago.

As indicated above, participation takes place on both levels, the level of explicit participation and the level of implicit participation. Contributing deliberately to an archive, either by uploading files or even more by generating the files in question first, since this is achieved through the labor of those volunteering in the Gutenberg Project, is an act of explicit participation. Fans publishing collections of their favorite subjects online or creating websites to present them are contributing actively, too.[260] The former video game producer *Atari* was not represented online at all for years with the exception of websites created by devoted fans who posted all kinds of material online related to the history of the company. Former employees and enthusiasts set up an entire online museum.[261] User can browse early Atari advertisements, scan boxes of Atari products and related manuals, as well as use the Atari games themselves. Although developed for a technically different platform, they are available through emulators simulating the original machines. Those collections often operate in the gray area between fandom and copyright infringement. The previously mentioned *Xbins* ftp server is another prime example of users filing programs and archiving them for further use and distribution.

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[260] Good examples of the labor of enthusiasts and fans in documenting and archiving their favorite subjects online are mentioned in: 8 bit Museum, an online museum for vintage computer systems from the 1980s: <http://www.8bit-museum.de>.
The Netlabel Catalogue, on the other hand, is more of an index than an archive, but constructs an encyclopedic collection of existing netlabels and their websites, where users can download music legally for free: <http://www.phlow.de/netlabels/index.php/Main_Page>.
Transforming Freedom is an initiative funded by the City of Vienna (A) to archive, index, and tag audio files of interviews and lectures in the field of open-source software, copyright, and freedom of information: <www.transformingfreedom.org>.
Similar to the Gutenberg Project is the work of volunteers who create audio books from public domain books, and publish them as free downloads on various websites, and in different languages: LibriVox (English), <http://librivox.org>; Vorleser (German), <www.vorleser.net>; Vooorlezer (Dutch), <www.voorlezer.net>; LivresAudio (French), <http://www.livresaudio.net>.

[261] The Atari History Museum, <http://www.atarimuseum.com/>.

Many data collections are created by fans or enthusiasts who want to provide access to a well-maintained and organized archive of their favorite subject. Collecting, indexing, and even commenting, aside from the technical aspects, such as providing the necessary web space, the interface to browse and access the collection etc., is valuable labor that in many cases makes content accessible that would be forgotten or lost. Users therefore make a very important contribution to the maintenance of cultural heritage. Most often this labor does not pay off financially but serves intrinsic goals. Other collections offer possibilities to efficiently retrieve files and bypass ensuing payment. Recent law suits against corporate file-hosting services, such as Rapidshare, made explicit that their service is regarded to primarily serve purposes of copyright infringement.[262] User activities that involve storing, presenting and, distributing media content are a perpetual source of corporate legal action and form one of many domains where a collision between old business models and the use of new technologies collide.

But the activities go beyond the labor of collecting, uploading, and presenting collected data online and increasingly involve the management of information, and generating meta-information for improved information retrieval. While archives in previous centuries executed a strict input control and maintained a system of categorizing and filing, the Internet just consumes everything users store on the many different web servers. Indexing information online takes place in a retrospective process through search engines' web crawlers. And these machines are not capable of indexing all websites or data stored online, which

[262] As the county court of the city of Düsseldorf in Germany stated in its finding (file reference: Az. 12 O 246/07) on January 23 2007, the majority of services provided by Rapidshare are not used for legal purposes and very convenient for the distribution of copyright-protected content. The court emphasized that the company benefits not insubstantially from this aspect, and is therefore required to take measures to avoid illegal file-sharing and copyright infringement. See "GEMA sieht sich erneut gegen Sharehoster Rapidshare siegen", Heise News, January 29 2007, <http://www.heise.de/newsticker/meldung/102599>.
It has to be mentioned that RapidShare, one of the biggest hosting services online, has been banned from most forums that revolve around the sharing of content, due to its policy of deleting questionable files quickly. The service is commonly dubbed as 'RapidShit'.

leads to the emergence of an unknown data void, irretrievable and impossible to rate. With the advent of the so-called Web 2.0, software design is able to create information management systems that implement user activities and offer handy techniques to add supplemental meta-information at will to every website and a plurality of files stored online. This significant change in channeling user activities to improve information systems will be discussed as default participation.

5. The extension of the culture industry

The previous chapters described a participatory culture unfolding through user activities that increasingly affect the production and distribution of media texts and software. This participatory culture is part of a media practice intrinsically affected by the qualities of related technology. Simultaneously promoted and represented in a popular discourse on social progress through technological advancement, this cultural practice manifests itself as an extension of established production routines of media texts and consumer goods. After having examined in Chapter 1 how a popular discourse promotes technology by associating it with social progress and traditional democratic values, framing it as enabling participation, and after having described how scholarly discourse produces the claim for participation and a legitimating discourse for the emerging media practice, Chapter 3 investigated to what extent media practice and its technology are related to one another, or rather intertwined. Chapter 4 examined the media practice of explicit and implicit participation and argued for conceptualizing participation as a heterogeneous and complex interaction of various actors, including design decisions and affordances. The following chapter conceptualizes participatory culture as an extension of the culture industry. It deliberately refers to the critical connotation of culture industry as formulated by Theodor Adorno and Max Horkheimer, but it does not strive for a Marxist understanding of participation. The agency of corporate companies, their influence on decision-making processes, their ability to control, and increasingly to exploit cultural resources has been neglected in many of the romanticizing accounts to user participation. It is also necessary to emphasize the emergence of new and very powerful media corporations who might not directly produce media content, but provide and control the platforms on which users not only create media content, but increasingly also their social life. Subsequently, the socio-political consequences of user participation will be discussed as confrontation, implementation, and

integration.

The term *extended culture industry*, as discussed in this chapter, designates the extension of modes of production into the sphere of users, consumers, and audiences who participate to various degrees in the creation and use of media texts, consumer goods, and digitized artifacts. It furthermore describes a shift of the cultural industries themselves that is extending their production logic into the sphere of users by deliberately employing their media practice and providing platforms to execute it. The extensions of the cultural industries rely upon an increase of participating producers, who as users appropriate the media products, or as entrepreneurs, collectives of developers, and amateurs create new artifacts outside of the conventional production channels, and who participate in creating, archiving and organizing cultural resources. Users do not necessarily engage in an alternative cultural production but may extend the modes of production developed within the established cultural industries. Appropriating commercial products, or independently developing media texts and software, collecting and organizing data, and providing access to information does result in extending the cultural production into the sphere of users. Industries based on their control of reproduction and distribution are challenged by the material aspects of digitized artifacts. However, with implicit participation, the cultural industries tend to adapt their classic business model and take into account actively participating users. In their activities, the cultural industries are shifting from creating content for consumption to providing platforms for creation.

Understanding user participation as a dynamics unfolding in the shape of an extended culture industry adds a critical notion to the concept of participatory culture (Jenkins 2006a, 2006b; Jenkins et al. 2006; Benkler 2006; Bruns 2008). While Jenkins defines participatory culture as a community-driven appropriation of commercial media texts, the concept of the extended culture industry acknowledges production beyond the established channels of corporate product development. It

furthermore emphasizes potential and actual interrelations between corporate designers and appropriating users; and it points out the overlaps between different areas of accumulation, archiving, and construction. Products that have been developed by users beyond the established industries can in turn be implemented into those industries' business models. Further, modified products may be re-implemented by their original vendors as new or further developed design. Other products may remain completely outside the conventional structures, or be released into a public domain in order to be re-used and employed for new creations, which in turn can re-enter the sphere of the culture industry.

More importantly, a concept of the extended culture industry does not posit the emerging media practice as a radically alternative production, as Bruns and Benkler describe it, but recognizes its mode of productions and media practice as ambiguously useful. Therefore, participation in the extended culture industry has been described without a generalizing positive connotation. This concept emphasizes the ability of the culture industry enterprises to employ user activities in a way that clearly questions the acclaimed status of users as producers, and it does not treat technology as a mere enabling factor, but considers its affordances and design. Using a term such as extended culture industry deliberately recalls the Frankfurt School notion of cultural production as a capitalist imperative. It refuses hasty enthusiasm about user participation, and thus questions the power structures unfolding in an interdependence of business and politics. By means of the categories of *accumulation*, *archiving* and *construction* (as outlined in section 2.2), a concept of the extended culture industry traces potential collisions, debates, and the society-wide discussion of the use and legitimacy of the new computer technologies. The term extended culture industry thus explicitly refers back to the label Adorno and Horkheimer attached to the text producing media industries (Adorno/Horkheimer 1947). Initially coined to characterize an industry serving the "false needs" it created, turning everything from emotions to ideologies into commodities, produced on an industrial scale and distributed to mass audiences

with standardized tastes, the term became widely associated with the media industries in general. The subliminal suspicion that the media industries serve a certain ideology and are highly manipulative is very strongly expressed in the term *culture industry.*[263] As sociologist Heinz Steinert, professor emeritus for deviant behavior and social exclusion at the Johann Wolfgang Goethe University Frankfurt summarizes, culture industry describes:

> intellectual production in order to create commodities (Warenförmigkeit). That means production in the broadest sense: Architecture, design, science and technology, urban and traffic planning, politics, public administration, management doctrines, and at last art and entertainment as well. As other commodities ideas, plans, processes, and artifacts are produced to be sold successfully and not, as it would be the task of intellectuals, to contribute to mankind's progress; that would mean to diminish hunger and fear, competition and middle class deadness, and social exclusion (Steinert 2003).[264]

Socio-political expectations meeting the activities of capitalist enterprises and industries are well summarized in this recent definition of the culture industry or *Kulturindustrie*.[265] And indeed this definition describes the "dark side" of the

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[263] Especially within Cultural Studies the agency audiences and individual consumers has been analyzed, as well as their confinement to power structures. This research does not neglect this body of work, but points out to which extent the agency of users is related to technological design, in either stimulating or averting user appropriation. It furthermore attempts to emphasize an understanding of participation that is not confined by an exclusively utopian connotation of participation. This allows to acknowledge the agency of corporate companies and their software design as a crucial aspect in facilitating implicit participation. This also allows to formulate a critique of reactionary strategies, which industries and their lobby organizations use to impose their technological design and regulations of use onto society.

[264] In German original: "intellektuelle Produktion unter den Imperativen von Warenförmigkeit. Und das meint intellektuelle Produktion im weitesten Sinn: Architektur und Design, Wissenschaft und Technik, Städte- und Verkehrsplanung, Politik, Verwaltungsorganisation, Management-Doktrinen, zuletzt auch Kunst und Unterhaltung. Wie andere Waren, so werden auch Ideen, Pläne, Programme, Abläufe und Artefakte so hervorgebracht, dass sie sich gut verkaufen lassen, und nicht, wie es Aufgabe der Intellektuellen wäre, mit dem Ziel, zum Fortschritt der Menschheit beizutragen - was ganz bescheiden hieße: den Hunger und die Angst, die Konkurrenz und die bürgerliche Kälte, die Möglichkeiten der sozialen Ausschließung verringern zu helfen.", in Jungle World: *Kulturindustrie ist alles*, interview with Heinz Steinert, Jungle World, No. 38, September 10 2003; <http://www.jungle-world.com/seiten/2003/37/1635.php> (10.9.2003).

[265] This dystopian view of media production was not shared in general by members of the so-called Frankfurt School. Most prominently, Habermas argued for a balanced view of the role of media production and media use. In particular, see the preface in the reprint of *Der Strukturwandel der*

media industries in particular and capitalist production in general, hidden under the surface of their products. Critical theory and cultural critique unveil the commodity imperative of the culture industry's production. Steinert's definition makes it very clear that the culture industry is a set of different industries, and many enterprises, divided into heterogeneous branches. That the culture industry constitutes culture and affects mindsets is evident in the following definition of the term:

> the term, 'the cultural industries', is surrounded by difficulties of definition. If we define culture, in the broadest anthropological sense, as a 'whole way of life' of a distinct people or other social group [...], it is possible to argue that all industries are cultural industries. (Hesmondhalgh 2002:11).

Hesmondhalgh emphasizes the role of the cultural industries in defining them as being "most directly involved in the production of social meaning" (ibid) and does not limit this classification to commercial companies only, but includes non-profit organizations and state authorities in itas well. However, his examination of culture industries is limited to the conventional media text production of advertising, broadcasting, movie and music industry, print and electronic publishing, video and computer games, and surprisingly *Internet industries* (2002:12). He does not involve communities, fan- and subcultures, or community-based production. Many authors have described crucial changes that have transformed the cultural industries over the past decades. The trend towards monopolization already criticized by Adorno and Horkheimer has been confirmed (Bagdikian 2004) and has been described as the emergence of powerful company networks and identified as the increasing vertical organiza-

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Öffentlichkeit (Habermas admits having overestimated the power of mass media in influencing audiences:
"Die Resistenzfähigkeit und vor allem das kritische Potential eines in seinen kulturellen Gewohnheiten aus Klassenschranken hervortretenden, pluralistischen, nach innen weit differenzierten Massenpublikum habe ich seinerzeit zu pessimistisch beurteilt. Mit dem ambivalenten Durchlässigwerden der Grenzen zwischen Trivial- und Hochkultur und einer 'neuen Intimität zwischen Kultur und Politik', die ebenso zweideutig ist und Information an Unterhaltung nicht bloß assimiliert, haben sich auch die Maßstäbe der Beurteilung selber verändert." (1990:30).

tion of corporations and business processes (e.g. Rifkin 2000; Castells 2000; Mommaas 2000, Rutten 2000).[266]

Extending the culture industry is evident in user activities, company strategies, and administration policies and legal adjustments, and it affects the execution of media practices and recognizes attempts at regulation, as well as the development of new business models and the emergence of new occupations and, most importantly, a reconfiguration of the conventional understanding of culture. What remains are the socio-political issues inherent in the design and appropriation of technology. Although Hesmondhalgh does not refer to the concerns of Adorno and Horkheimer, he describes the cultural industries as affecting our lifeworld Emerging media practices and new technologies cause conflicts, change old routines, and call for socio-political mediation. In the extended culture industry, many actors engage in these debates and attempt to define technology accordingly in design, media practice, and legal regulation. Referring to Heidegger, one could state that technology reveals "ways of being" (Heidegger 1962), and with reference to Latour, Pinch, Feenberg and others, that technology and its design must be recognized as an arena for debating socio-political issues (Feenberg 1999:17; Latour 2005b:26). Shaping technology, therefore is also building society (to quote the title of a famous collection of essays edited by Bijker, and Law [1992]).

The following sections organizes socio-political and cultural effects of participation according to aspects of *confrontation*, *implementation* and *integration* (consensus). Confrontation refers to the collision of the new media practice and established conventions of production, and describes how attempts are made either to change the legal situation in order to preserve the conditions under which old media practices had functioned in spite of the possibilities offered by new technologies, or to design technology in a way that would prevent appro-

[266] The development of a global networked economy with focus on real time financial transactions has been described as "digital capitalism" (Schiller 1999).

priation. **Implementation** describes the extent to which the new media practice can be implemented into software design. It sees the ability of enterprises to successfully exploit new tendencies and take advantage of them. Unlike confrontation, implementation is less obvious and attracts less attention. It is a subtle and often neglected process that takes advantage of certain user activities. Primarily taking place at the level of design, implementation channels user activities to create new business opportunities. **Integration** refers to how the new media practice can constitute an integrative approach to production and labor. It harnesses many values and practices developed over the past decade. On a global level, users are collectively participating in creating and developing resources and means of production that can in return be employed locally for commercial purposes. Their approach to copyright, patents, as well as collaboration and business models, is clearly distinguished from the established cultural industry model, which rests upon the exploitation of copyrights.

While *confrontation* aims at preserving old business models, both *implementation* and *integration* employ emerging media practices for new modes of production. To use an old Chinese saying, when the wind of change is blowing, some are building shelters but others are building windmills. The DMCA, Trusted Computing, and software patents are shelters for weary giants, while P2P, Web 2.0, and open-source software might be windmills in a digital age.

5.1 Confrontation: Fighting participation

> Technological design is the key to cultural power. (Feenberg 1999, 86)

Appropriation of corporate design and commercial media texts, as well as developing the means for global distribution, pose a serious challenge to established business models. Losing control of the distribution of digitized artifacts is a crucial factor in the clash between old business models and new media practices. The many confrontations between users and corporations, monopolistic conglomerates, legal administrations, and the participating civil society are deeply rooted in a process of renegotiating power relations in view of the new technologies. As Feenberg summarizes:

> Because technologies have such vast social implications, technical designs are often involved in disputes between ideological visions. The outcome of these disputes, a hegemonic order of some sort, brings technology into conformity with the dominant social forces. (p.89).

Design decisions and proposed legal regulations represent different ideological viewpoints. The confrontations provoked by certain aspects of new media practice have been reported widely in mainstream media. For example, a heated debate took place regarding the open and collectively produced encyclopedia Wikipedia.[267] GNU/Linux, and open-source software in general,

[267] One of the most prominent opponents of Wikipedia is Andrew Keen: The Cult of the Amateur. Keen, however, is not a representative or noteworthy critic of Wikipedia, rather he is a symptom of the changing social perception of knowledge and its creation. Keen's critique focuses on the different process of creating an encyclopedia. Claiming that Wikipedia is a unreliable source because anybody could just publish anything, he praises the Encyclopedia Britannica as reliable. However, while Encyclopedia Britannica relies on a process of expert knowledge through selection in academic discourse, Wikipedia filters through discussion and peer control after publication. And this process is made explicitly visible in Wikipedia and can be traced through the *History* and *Discussion* options that are linked to all articles, revealing the entire process of creation. Assuming thats texts produced by individuals who are not institutionally recognized and professional experts are amateurish and mediocre, Keen represents perfectly the need for "guaranteed" and "safe".

was attacked for years by the Microsoft Corporation and through attempts by established industry players to preserve their role in the market, which was based upon large patent portfolios.[268] Recent years have seen a extensive campaign by the music and film industries to prevent online distribution, and to criminalize downloading in general.[269] Especially in the media industries, one business sector has been characterized as a *copyright industry,* a term describing those companies whose business model mainly revolves around the exploitation of the copyright on copyrighted products, often labeled "public goods" (Siwek 2004).[270] Those media products were easier to control and to commercially exploit when distributed as 35 mm film, vinyl records, or in print form, but in digitized form they can be copied losslessly and distributed uncontrollably. The term *public good* is of course misleading and creates an association with commons, goods that are legally open for public use and make up the cultural resources. Hesmondhalgh therefore speaks correctly of *semi-public goods* to indicate their limited accessibility (2002:17). Such scarcity is in fact created artificially in order to reduce the distinctive risks of the media business,

knowledge.

[268] The discourse on open-source software has been examined with respect to exclusion and inclusion strategies (Van den Boomen; Schäfer 2005).

[269] It was Apple's *iTunes* store that provided the first successful commercial platform for music downloads in 2001. The absence of any functioning music download service probably increased the use of P2P file-sharing systems, which managed to establish themselves as a main mode of downloading files.

[270] Siwek, consultant at *Economists Incorporated* and author of industry association-financed surveys for the *Institute for Policy Innovation* , is also author of a survey claiming that copyright infringement and "piracy" would cost $12.5 billion and threaten over 71,000 jobs: Siwek, Stephen (2007). This point of view is based on the assumption that all "illegally" copied songs would have been purchased in stores if file-sharing would not exist. The survey has been criticized for not using official data from the US Census Bureau, but being founded on estimates provided by the related industries. As Gehring points out in the German technology magazine *Golem*, the US Census Bureau data indicates a growth of the music business: Robert A. Gehring: *Neue Studie zu Folgen der 'Musikpiraterie*, Golem, August 23 2007, <http://www.golem.de/0708/54301.html>.
This perspective can be seen confirmed in a *Price Waterhouse Coopers* survey forecasting a annual 6,6% growth for entertainment and media industry to an estimated 1,8 trillion Dollar market by 2010; see PWC press release:
<www.pwc.com/extweb/ncpressrelease.nsf/docid/283F75E5D932C00385257194004DDD0A>.

high production costs, volatile business and the relatively high chance of misses, by tighten control over distribution and market regulation through copyright policies, and vertical market organization (Rifkin 2000; Hesmondhalgh 2002). This business model came under severe pressure through the digitalization of media products and the ability to distribute them at almost no cost. The new and barely controllable distribution channels constitute an extension of the conventional culture industry, as is the case for collecting and accumulating media texts online and providing access to them. Altering and changing existing or producing new and related media texts does not only extend the established production channels, but produces additional texts, which are intertextually linked to the original media texts and reflect a process in which media reception is intertwined with the creation new media texts (Uricchio 2004a; Jenkins 2006b).

Many confrontations have taken place in an area that has traditionally been defined as the so-called fair use of media content, but which becomes highly controversial under the Digital Millennium Copyright Act (Lessig 2001:187-188, EFF 2004). Within the sketched cultural production of users (see Fig. 4), this is applicable for activities of accumulating, archiving, or distributing and commenting on media content produced within the realm of established media industries. Modifying hardware or software and violating terms of use, patents and copyrights often leads to confrontations as well. Confrontations are caused by:

a) Threatening the existing business model by either changing hardware and/or software, or distributing content outside of the industry's controls (e.g. modchips; criminalized file-sharing of music and audio files, bypassing regional limitations of distribution).

b) Threatening the business model by introducing an alternative model that delivers competitive products (e.g. open-source products, free music

downloads, creative commons, open access, collaborative knowledge construction, as in Wikipedia).

c) Accumulating large quantities of media content and granting uncontrolled access and use to third parties, either paid or unpaid, depriving copyright holders of control (e.g. fan sites, fan archives, share-hosting sites, etc.).

d) Changing, satirizing, or appropriating media products (e.g. game mods, commentary, critique on media content).

Here, old business models and new media practices collide. As has been argued in previous chapters, many debates are caused by conflicts resulting from medium-specific (technological) qualities and their social use. Figure 14 presents a list of confrontations and defines the elements threatening established ways of producing and distributing artifacts or the creation of knowledge. It provides examples for new media practices and to what extent they threaten established business models or modes of cultural perception. Confrontations grow out of the new quality of generating knowledge and using computers, the Internet and software, hence the "material" aspects of digital culture.

In view of the examination of the material aspects of computer technology, software, and the Internet, it becomes clear how closely and mutually dependent media practice and material affordance are. Wikipedia turns the conventional process of compiling an encyclopedia upside-down and provokes pessimists to mourn the decline of expert culture, as does the publishing principle of Open Access that aims at the quick, non-bureaucratic, and easy publishing of academic papers without paying large sums to publishing houses that usually thrive on the free labor of scholars and scientists, as well as on the tax-funded subsidies of libraries.[271] Open-source software, such as the

[271] There are various understandings of how Open Access works, some involving a fee to compensate the publishing house for providing the platform and process for publication, whereas some are not monetary-based. For a detailed view on the various forms of Open Access see Willinsky 2005:212-216.
However, the publishing industry is challenged by the increasing interest of the scientific and

GNU/Linux operating system, threaten the concept of proprietary software.

Name	Practice	Confrontation	Attacks	Opponent
Wikipedia	Collaborative production, free use, non-monetary-based distribution.	Classic construction of knowledge and understanding of expertise.	E.g. Encyclopedia Britannica, Encarta, etc.	Representatives of conventional knowledge institutions; defenders of a so-called expert culture.
GNU/Linux	Collaborative, open-source, non-monetary-based distribution	Classic production model, proprietary software, software as commodity.	E.g. Microsoft Windows.	Microsoft, SCO.
P2P Networks	File-sharing.	'Channeled' distribution versus 'distributed' distribution	Control of distribution channels.	Copyright industry in general (music and film industries).
Modified chips for game consoles	Executing non-vendor code, playing copied games.	Product definition, product design.	Business model of Microsoft, Sony, Nintendo.	Microsoft, Sony, Nintendo.
Open Access	Publishing academic papers online and granting free access.	Internet based practice of free information and classic publishing.	Established distribution and sale of academic books through few publishers.	E.g. American Association of Publishers (AAP), Elsevier, Sage, Springer.

Fig. 14: Examples of confrontations provoked by media practice and material affordance

scholarly community in free open-access publications that lead to counter activities, such as PR activities, to lobby against a concept of open access. See Jim Giles, PRs "pit bull" takes on open access, in Nature, Vol. 445, No. 347.

Digitized movie and audio files challenge the industry's building a business model to control the distribution. Modified hardware and software for game consoles turn them into open-media entertainment platforms and threaten revenues by making obsolete the purchase of additional features, such as games, remote controls, and online services. Furthermore, modifying hardware and copying media texts generates new markets—often criminalized as product piracy and copyright infringement—and significant revenues.

However, not every confrontation will inevitably lead to a lawsuit; many are merely attempts to regulate the emerging media practice according to the logic of the culture industry of pre-Internet times. At stake are large profits and market dominance, controlled by corporations engaging in friendly competition, defending their slice of the cake by any means necessary, from discrimination by lobbyists to direct pressure on decision-makers and legal administrations. The appropriation of software and software-based products has to be examined in context of the larger debates on the legal issues of computer technology. The design and definition of technology and its use become highly political in these arguments. Confrontations with powerful companies and industry associations probably lead to political awareness and organization among those who embrace and defend the new media practice. Figure 15 presents a number of incidents that received mainstream media coverage in order to stress the frequency of legal confrontations and identifying the actors participating in them.

Case	Subject	Consequences
Etoys vs. Etoy (USA 1999-2001).[272]	Domain: US-based online toy shop requires domain from Swiss art group and files lawsuit.	a) Art group launches online resistance and sabotage acts. b) Decrease of Etoy's stock value after losing lawsuit. c) Netactivism.
RIAA vs. *Napster* (USA Dec 1999-May 2001).	File-sharing: popular band Metallica and rapper Dr Dre, supported by RIAA, sue Napster.	a) Napster shut down. b) Development of second-generation P2P protocols.
Buma/Stemra vs. *Kazaa* (NL 2003).	File-sharing: Dutch copyright organization sues KaZaa.	Kazaa cannot be held liable for user actions.
Operation Digital Gridlock (USA 2004).	FBI action against a closed file-sharing network, six houses are searched and one Internet provider's offices.	Conviction of four operators of file-sharing servers known as The Underground Network.
Operation Fastlink (2004).	FBI and international authorities search and seize 120 sites in 12 countries, over a hundred alleged members of the warez scene are affected.	47 convictions.
Operation D-Elite (USA 2005)	Homeland Security works with FBI to shut down the bit torrent network *elitetorrents*. The MPAA assisted in the investigation.	Conviction of six operators from the Elite Torrent network.
Operation Site Down (USA 2005)	FBI and international police authorities seize hardware and software in 10 countries to dismantle the biggest warez groups.	Five convictions in the US, many scene members went into hiding, several sites went offline and several groups were discontinued.
MGM vs. *Grokster* (USA 2005)	File-sharing: MGM and MPAA sue file-sharing network Grokster.	Grokster discontinues file-sharing application.
Raid on European piracy scene (GER, A, NL, PL, CZ 2006)	Authorities search offices, houses and confiscate servers & equipment.	Participation revealed of the German copyright enforcement association in illegally distributing activities through use of *honeypots*.
Raid on *Pirate Bay*, (SWE 2006)	Under MPAA pressure, Swedish authorities raid the office of Pirate Bay, confiscating servers.	Political scandal, international attention and support for Pirate Bay; improvement of their infrastructure.
Stolen Xbox 360 development kits (A 2005)	Theft: authorities raid the house of Austrian hacker and member of modchip team SmartXX, who got hold of stolen Xbox 360 development kits.	Microsoft tries to halt investigation later and allegedly pays the hacker's lawyer and expenses.
Raid on modchip shops (USA 2007)	Homeland Security sides with FBI for nation-wide raid of shops providing modchips.	No results as of July 2008 – case ongoing

Fig. 15: Confrontations involving authorities' actions and lawsuits

[272] Grether Rheinold: How the etoy campaign was won, in Telepolis, February 26 2000, <http://www.heise.de/tp/r4/artikel/5/5843/1.html>.

The new participation of the former audiences as active users transpires into a 'battle royale'.[273] The altercation takes place on three different levels: the level of *popular and public discourse*, the level of *technical design*, and the level of *legislature*. On the level of *popular and public discourse*, all participants seek to communicate their concepts and arguments and to discredit competing practices and their promoters.

On the level of *technical design*, the respective visions are implemented into technology and the respective media practice is subsequently channeled. The level of *legislature* reflects the actual process of manifesting and regulating the respective technological concepts and media practice in laws. The discursive character of technology and its development, of design and designer's cultures, ideological connotations and socio-political visions, and the organization of markets, is clearly evident in the disputes and confrontations caused by design and appropriation in the current media practice (Van den Boomen, Schäfer 2005). The outcomes of these confrontations will deeply influence the regulation of technology and determine the cultural freedom of its users.

In defending their cultural freedom and their way of using computer technology and the Internet, the explicit participation of users enters the zone of public debate and decision-making processes, stepping beyond the closed and limited communicational confines of the interested parties. Users start acting as citizens and claiming civil rights for their actions. They seek to transform their knowledge of technology into a legally protected practice, and hence integrate

[273] For more examples see: *Downhill Battle*, a pressure group promoting file-sharing and copying mobilizing support to battle the music and film industries. To demonstrate against censorship by the music industry, representatives and copyright holders against the DJ Dangermouse record *The Grey Album*, a remix of the Beatle's *The White Album* and Jay Z's *The Black Album*, Downhill Battle initiated *Grey Tuesday*, a day of demonstrating people's objections to current copyright law. Participating websites appear in gray, feature banners, and provide downloads of the Grey Album. *Steal That Film* is a series of documentaries on file-sharing and the legal actions undertaken by copyright-holding industries and their representatives; Steal this film I (The Noble League of Peers, UK, D 2006) and Steal this film II <http://www.stealthisfilm.com/Part1>; <http://www.stealthisfilm.com/Part2/>.

specific forms of technology use into society. Aside from the example of the AIBO user communities attracting media coverage for their cause, there are plenty of other examples illustrating how media practice is set on the public agenda.

The UN declared open-source software as worthy of protection during the World Summit on the Information Society in 2003. Increasingly, GNU/Linux and open source in general were perceived as transparent, democratic, fair, beneficial to society, and inherently anti-commercial. Despite the fact that none of these attributes correctly reflects open software or the diverse and heterogeneous participants engaged in developing and using it, it creates the "imago" and general symbolic capital of Linux and open-source software. In 2003, Monica Lochner-Fischer—a politician from the German Social Democratic Party and a trained computer scientist—campaigned with the slogan "More Linux, More Freedom." In an interview with the online magazine *Telepolis*, she emphasized the relevance of meeting politicians in person to explain to them how software patents would affect labor, business opportunities, and cultural freedom.[274] When a coalition of lobbyists and politicians tried to launch patent laws favorable to the big players in the software and automation industry, a heterogeneous front of activists responded by making the issue public. Going beyond the circles of business and programmers, the software patent issue reached the mainstream media in 2004, and in 2005 the European Parliament surprisingly refused the EU commission's directive on software patents (Van den Boomen, Schäfer 2005:60-61).

When it became known that American authorities might have pressured Swedish authorities into engaging in a battle against *The Pirate Bay*, the result was not only public outrage about the interference in national sovereignty, but it also

[274] Telepolis: *Mehr Linux, mehr Freiheit*, interview with Monika Fischer-Lochner by Peter Riedlberger and Peter Mühlbauer, in Telepolis 17 July 2003, <http://www.heise.de/tp/r4/artikel/15/15239/1.html>.

resulted in the establishment of a Swedish Pirate Party. In the wake of events in Sweden, Pirate Parties sprung up in other European countries as well.[275] Although those parties are unlikely to wield political influence, they put the question of file-sharing and the related media practice on the public agenda. Well-known politicians and established parties have begun to recognize the potential of gaining votes by promoting the cultural freedom of users.

The material aspects of software-based products caused the development and research process to also be extended into the sphere of users, whether amateurs or professionals who improved and modified the original product into a derivate. Jenkins describes this process as *convergence culture*, in which top-down corporate strategies interact or collide with bottom-up user activities (Jenkins 2006b:243). The possibilities for consumers to react to top-down strategies have increased exponentially, and companies are well-advised to take into account users' abilities for generating attention and their tactics in defending their cultural freedom. Furthermore, recent publications have convincingly shown that innovation and improvement is not limited to conventional research institutions and companies (Abbet 1999; Oudshoorn, Pinch 2003; Hippel 2005).

[275] Pirate parties include the Swedish party *Piratpartiet*, <www.piratpartiet.se>, the Austrian *Piratenpartei*, <www.ppoe.or.at>, the German *Piratenpartei* <www.piratenpartei.de>, the Dutch *Piratenpartij* <www.piratenpartij.nl>, the French *Parti Pirate* <www.partipirate.fr>, as well as pirate parties in Argentina, Australia, Brazil, Canada, Finland, Ireland, Italy, New Zealand, Norway, Spain, Switzerland, and other countries. The international platform is *Pirate Party International*, <www.pp-international.net>.

Modchips, gray markets and big business

The case of modified game chips illustrates how the conflict about design, affordance, and appropriation manifests itself at various levels, that is in popular discourse, in technical design, and in legal actions. In the case of game console modification, for instance, the conventional business model of such consoles is threatened. As André Vrignaud, a member of the team who developed Xbox, explains on his weblog that the industry in fact uses an attachment model that lets their clients benefit from subsidized hardware with the intention to make profit by selling attachments, i.e. games, online services or additional hardware.[276] In other words, using the game console as a platform for software that turns it into something entirely different, implies that the purchase of such attachments no longer is necessary, and that users can benefit from the subsidized hardware by using it for which, otherwise, they would have to buy much more expensive devices. Vrignaud's weblog, which is arguing from the point of view of the industry is one of many channels available to discuss the question of modchips. Vrignaud even assures readers that, in principle, it would be fantastic if users customized the game consoles to their own specifications, if it weren't for the modchips that the industry simply cannot condone, because they enable the playing of illegally copied games and would have a damaging impact on the business model. Users, on the other hand, often feel patronized by companies regulating the use of the devices for which consumers paid considerable amounts of money. On gaming platforms, in special interest magazines as well as, technology-focused media, modchips remain an issue that is discussed regularly. The dispute about modchips, however, does not frequently make mainstream news, with the exception of spectacular cases, such as the above-mentioned raid on a *SmartXX* team member in Austria in October 2005 or the United States-wide raids of modchip shops in August 2007. Unlike the issue of distributing music and video files, which fall under the intellectual property indus-

[276] Weblog entry *The Problem with Modchips*, by Andre Vrignaud on Ozymandias.com: http://ozymandias.com/archive/2006/07/31/The-Problem-with-Modchips.aspx, July 31 2006.

tries concerned, the issue of modchips rarely finds its way into the mass media and rather stays within the sphere of the participants involved. The original inventors resist unsolicited modifications of design or legislature condoning it, and prefer to resort to public campaigns or lawsuits in order to protect their interests.

At the design level, detection systems try to recognize modified game consoles and then exclude them from connecting to extra online services, while, in addition firmware updates that are regularly downloaded on the consoles prevent the use of homebrew software. Encryption technologies implemented in the chips impede potential cloning and redistribution. User who want to use homebrew software have no other choice than modifying their gaming device. In consequence they often lose warranty guarantees, and are excluded from additional services, such as in case of the Xbox, the use of Xbox Live! services.[277] At the legal level, modification is hindered by the expiration of warranty claims for modified consoles and by legal actions against modchip producers. The dominant corporations made efforts in Australia, the USA, and Asia to ban the production of modified chips. The legal argument completely disregards the added value provided by modified chips and does not take into account practices that are in fact perfectly legal, such as executing homebrew software and making back-ups; instead it focuses solely on the possibility of playing copied games. What is rarely mentioned in the media or in statements made by the companies concerned are the revenues modchip production and sales are generating. Producing modchips is not a leisure activity of some enthusiastic amateurs, but requires funding for research and development, division of labor, sophisticated skills in building hardware and programming

[277] This rigorous limitation of the consumer device to the vendors' design decisions provided actually rather an argument for mod chips. The industry changed the strategy,such as in case of the Xbox 360, or the iPhone through providing development kits and distribution channels for third party provided applications, regardless whether developed by professionals or enthusiast users. Through providing the means for production and the distribution platforms, the companies can actually control user appropriation more effectively. Apple recently banned the application MailWrangler, a user developed e-mail client, from its App Store, allegedly to avoid "user confusion" with the Apple provided e-mail client.

encryption, a supply chain producing the actual chip, and a distribution system. Since the labor is illegal, it actually becomes an organizational challenge.[278]

The DMCA, which was proposed initially by lobbyists of the media industries, helps corporations like Microsoft, Sony, and Nintendo to impose their definition of media use onto customers. In countrywide raids, US customs and Homeland Security shut down many distribution nodes of modified chips.

Although the production costs of modchips indicate a rather large business scale, the labor is achieved by only a few participants. While a small team develops the modchip, the actual production is outsourced to a manufacturer;[279] and a variety of online webshops is distribute the chips to users. At the local level of device installation, the business is not run by criminal, money-laundering companies as the industry's accusations often claim, but instead it is primarily organized as a rather small type of business that involves semi-professional, enthusiastic gamers. The authorities, however, have not only adopted the industry's position, but also the way in which the industry lobby describes the modchip producers, which resulted in a restrictive legislation. As Julie L. Meyers, assistant secretary of *Homeland Security and Immigration and Customs Enforcement* (ICE) stated after the 2007 raid: "Illicit devices like the ones targeted today are created with one purpose in mind, subverting copyright

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[278] From an interview with a modchip developer: Development and production costs add up to $25 per unit, which are sold for $28 each. The minimum of units built for a generation of modchips are approximately 40,000. With sales between 300,000 and 400,000 modchips for the first Xbox, the interviewed modchip producers estimated to have gained a market share of 35% at the time. In order to start building a modchip, initial costs for development, and the purchase of components adds up to estimated $600,000 for 40,000 chips.
Known teams of Xbox modchip producers are: Aladdin Chip Team, Duo X2; OzChip Team, SmartXX, Team Omega, Team OzXodus, Team SpiderXS, Team Xecuter, Team X-Changer, Team X-Chip, Team Xodus,
Well-known teams of Playstation 2 modchip producers include: Infinity Team, Matrix Infinity, Messiah Team, Modbo Team, MXL2 Team, Ninja Team, Ripper Team.

[279] Surprisingly, modchip development and production has been organized in a primarily Europe-based scene. However, so-called "cloners" have copies of chips or modchips produced at low cost in Asia. Due to cloning, modchip producers are also forced to protect their product with cryptography.

protection".[280] According to Homeland Security, modchips stood to cost copyright-holding industries an annual loss of $250 billion, which is what they used to justify the severe measures they took. However, these are figures almost impossible to verify, and they are usually provided by the industry associations themselves.

Actions like shutting down modchip distributors and suing gamers for installing these devices into game consoles, as well as excluding modified consoles from online services, just foster an image of corporations as Goliaths and hackers as Davids, fighting a much stronger opponent who—in the perception of the communities—can influence legislation and thus buy justice.

Open-source software, from hobbyists to business

Off-the-shelf software for microcomputer home users was more or less invented by Bill Gates when he wrote the oft-quoted 1976 *Open Letter to Hobbyists*.[281] Blaming users for exploiting the labor of programmers by using their programs without paying, Gates formulated a vision of software as commodity. The benefit for hobbyists would be efficient off-the-shelf software that could be produced commercially once users understood that they had to pay for it. This production logic and ideology has been labeled as the *Cathedral* by Eric Raymond, who distinguishes it from the logic of the *Bazaar* that applies to open-source software (Raymond 1998). Hobbyists' software might never have troubled Microsoft, but when GNU/Linux became more successful among IT professionals, it was

[280] BBC News: Crack down on US modchip sellers, August 2 2007, online: <http://news.bbc.co.uk/2/hi/technology/6928177.stm>.

[281] Gates, Bill: Open Letter to Hobbyists, February 3 1976; the letter is posted online: <http://www.blinkenlights.com/classiccmp/gateswhine.html> [sic]
Of course, the software industry is more than just Microsoft. But Microsoft's Windows represents not only a software monopoly, it completely shapes perceptions of personal computing, and strongly affects the use of computers by common end-users. For a more balanced and historic overview on the development of the software industry, see Cambell-Kelly (2003).

less the software itself than the logic of its production and distribution that raised concerns in Redmond. The degree to which Microsoft felt threatened by GNU/Linux's fundamentally different approach to software creation and distribution was disclosed in the legendary *Halloween Documents.*[282] These documents reveal that Microsoft had plans for a strategy called *Fear, Uncertainty and Doubt* (FUD). This strategy had an impact on popular discourse and legal matters, and Microsoft duly attempted to exert tremendous influence in these spheres. However, publishing the Halloween Documents was part of the popular discourse as well, first attracting Linux enthusiasts only, but soon spreading as news across mainstream media channels. Microsoft tried to launch a funny message to communicate the risks of an open system. In October 2000 it displayed an advertisement in *c't*, Germany's most important computer technology magazine, stating "an open operating system does not only have advantages" (see fig. 16). The claim was illustrated with mutant penguins. The message was perceived differently by Linux enthusiasts; they celebrated being officially recognized as worthy of anti-propaganda campaigning.

The Microsoft-Linux confrontation is, like the campaigns waged by the music and film industries against file-sharing, the most visible and broadly distributed conflict. It ranges from software-developing communities to the European Parliament, affecting decision-making processes about software patent regulation, and constitutes a vision of critical technology production that promises to be applicable to many different sectors of cultural production and socio-political issues. Microsoft vs. Linux represents the most fundamental conflict in the different ways one can perceive software and its production.

[282] The Halloween Documents are a series of internal Microsoft memos dating back to October 1998, which were disclosed to open-source promoter Eric S. Raymond, who published them, unveiling Microsoft's intentions to possibly fight Linux. The documents are available at: <http://www.catb.org/~esr/halloween/>.

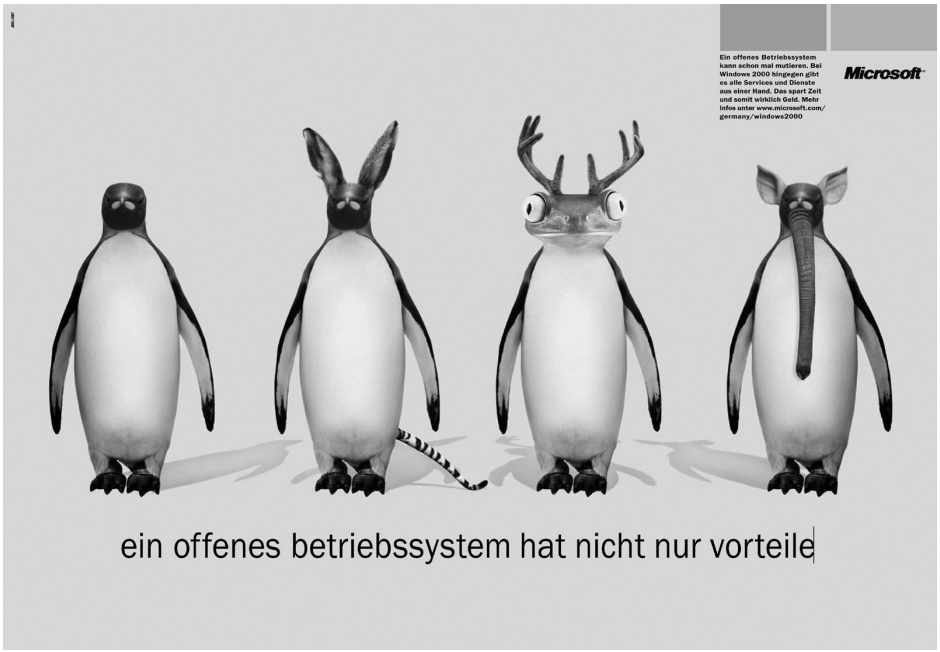

Fig 16, Microsoft advertisement in c't October 2000

Communication strategies were developed by all participants, creating competing rhetorical frames through the use of metaphors, associations, and images to shape the perceptions of technology accordingly (Van den Boomen, Schäfer 2005). Through these discursive strategies, each side's argument was supposed to be communicated by the media to win public opinion and the assent of decision-makers. With respect to the practice of sharing programming code and publishing under so-called copyleft licenses, such as the *GNU Public License* or the *Creative Commons* licenses, Microsoft representatives often tried to manufacture a link between these licenses and copyright infringement, communism and the exploitation of creators and inventors, as the following statement of Bill Gates demonstrates:

> There are fewer communists in the world today than there were. There are some new modern-day sorts of communists who want to get rid of the incentive for musicians and movie makers and software makers under various guises. They don't think that those incentives should exist. [...] But the idea that the United States has led in creating companies, creating jobs, because we've had the best intellectual-property system, there's no doubt about that in my mind, and when people say they want to be the most competitive economy, they've got to have the incentive system. Intellectual property is the incentive system for the products of the future.[283]

The same argument has been used widely also by the music industry, which has run many campaigns advocating the protection of creativity in order to fight file-sharing. Such statements, however, conceal the patents and copyrights also serve as instruments of market regulation and control. In other words, the promoters of software patents and the promoters of strict and long-lasting copyrights for among others, music and films, often refer to culturally shaped associations: the Microsoft rhetoric relies on associating its products with the *free market* that is glorified as a democratic institution where customers can choose the best products. It is somewhat ironic that a Microsoft White Paper, promoting the free market as a realm of fairness guaranteeing customer choice and product competition, should be entitled *Enabling the Market Place to Decide*.[284] But by secretly investing into the SCO company, which owns the intellectual property rights of some *Unix* code, and Microsoft held shares of a firm that started suing big corporations using GNU/Linux systems for copyright infringement.[285] Expensive and disruptive lawsuits against IBM, Novell, Daimler Chrysler, and others eventually led to the downfall of SCO, who were unable to

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[283] Bill Gates in an interview with *Cnet* author Michael Kanellos: *Gates taking a seat in your den*, January 5 2005, online article at News.com: <http://news.com.com/Gates+taking+a+seat+in+your+den/2008-1041_3-5514121.html>.

[284] Bradford L. Smith: *The Future of software. Enabling the market place to decide*, in Wynants; Cornelis (2005:461-477).

[285] The SCO Microsoft connection was made public in 2003 when investor BayStar Capital admitted that Microsoft had secured a 5$0 million investment on condition that it could execute intellectual property claims.

prove any infringement of their intellectual property, but who were able, for quite some time, to efficiently spread the fear of potential lawsuits among companies using GNU/Linux. In response to the SCO accusations, websites were put up to comment on the Microsoft strategy[286], hackers defaced the SCO website[287], and Linux communities organized and financed responses to defend Linux from being criminalized.[288]

Microsoft teams up with governments and offers educational services to high-school students to train their ITC skills. The focus here of course is exclusively on Microsoft products. Similar to the music and film industries, Microsoft offers complete teaching materials to train the students' understanding of copyrights and patents. The Microsoft campaign *Get the Facts* provides results from Microsoft-financed surveys on the costs and risks of Linux use and the benefits of using the software from Redmond.

On a technical level, Microsoft avoids opening its application interfaces to third-party developers. Bundling as many applications as possible into the operating system, the market of messenger services, Internet browsers, and media players is dominated by Microsoft solutions that are offered to clients as a default setting. The Microsoft-Linux confrontation lost its spark when the open-source company Novell and Microsoft started to collaborate in licensing questions in 2006.[289] However, it remains a revealing example of how different

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[286] One of the most famous commentators on the Microsoft-SCO affair is Pamela Jones' weblog *Groklaw*, <http://www.groklaw.net>; Groklaw covers lawsuits in the field of open-source software and software patents with the goal to explain and comment on the legal aspects for an audience not familiar with law.

[287] After the hack the site displayed the slogan *We own all Your code, Pay us all your Money* as part of the corporate identity. See Matt Hines: Hackers deface SCO website, Cnet 29 November 2004, <http://news.cnet.com/Hackers-deface-SCO-site/2100-7344_3-5469486.html?hhTest=1>.

[288] An anti-Microsoft attitude is also expressed in countless pictures posted on websites showing the Windows logo photoshopped as a swastika, Bill Gates as a fascist, or pictures mocking the flamboyant Microsoft Word interface testify to the anti-Microsoft attitude.

[289] Novell is a software company most known for its GNU/Linux operating system SUSE Linux.

approaches to working with software eventually lead to confrontations and severe competition for market leadership.

The issue of participation is a crucial factor in the conflict between Microsoft and Linux. While the software giant applied the logic of mass-produced goods to a digital artifact, the open-source developers followed a different logic. Software has been increasingly perceived as a cultural resource that is difficult to build for a single company, but more easily developed by communities. It goes without saying that developing open source software is not necessarily an altruistic quest undertaken by devoted programmers for counter-hegemonic reasons (e.g. Van den Boomen, Schäfer 2005:48; Weber 2005:66).[290] Furthermore, Gosh et al. showed that many programmers receive monetary compensation for what they do (2002). However, the economics of open-source software do not work like that of off-the-shelf software, instead it thrives on a community of programmers creating software as a resource free for all to use, extend, and improve. Drawing from that, resource business models revolve around customized software solutions and services. They create their means of production in collaboration with others, a value that can be transformed into profitable business opportunities (Gosh 1998; Gosh 2005; Raymond 1998). Participating in the collective production of a cultural resource like open-source software is significantly different from the user activities Jenkins describes as participatory culture, since their labor primarily involves proprietary resources regulated and owned by media industries. In open-source software development, participation includes the right to profit from the collectively

[290] Open source software promoter Eric Raymond' represents a business-oriented and capitalist approach to open source software, and the entrepreneurial success of enterprises, such as Red Hat or Novell—leading companies in distributing GNU/Linux operating systems and related services—shows that open source software can be implemented into business models. However, a strong ideological connotation is recognizable in many open source software projects. Rastasoft's software *Dynebolic,* a GNU/Linux based multi-media production center, is explicitly aimed at activists <www.dynebolic.org>. The software is consequently dedicated to the memory of famous activists, such as Patrice Lumumba, Martin Luther King, and Malcom X as well as to "all those who still resist slavery, racism, and oppression, who still fight imperialism and seek an alternative to the hegemony of capitalism in our world" (Jaromil 2005:203).

generated value. This will be discussed later in section 5.3 as *integration*.

Music and movies, the unbearable lightness of P2P

> The industry will take whatever steps it needs to protect itself and protect its revenue streams...It will not lose that revenue stream, no matter what. (Steve Heckler, Vice President, Sony Pictures Entertainment, 2000)[291]

The battle royale between the music industry and consumers shows how Internet and software features challenged an established industry and is reconfiguring it for good (Alderman 2001; Renner 2004). While bandwidth and traffic costs postponed the problem of digital distribution for the film industry for a few years, the music industry was confronted with it when university student Shawn Fenning released a program that searched for music files and downloaded them to the user's computer (Lessig 2001:130-132). Once music was ripped from compact discs and turned into MP3 files, the files could easily be distributed through e-mails sent from one person to another and eventually affect the basic organizational logic of the music industry (Benkler 2006:51-52). As Benkler points out, the copyright concept in the music industry relied on difficulties of mechanical reproduction, which made it too expensive to reproduce and distribute music. That obstacle was overcome through digitization and a worldwide infrastructure for inexpensive distribution. In addition to uncontrolled distribution, the music industry felt also challenged by a new media practice of creative appropriation. The practice of remixing and re-using music, which had already proved a significant cultural aspect of music cultures such as Hip Hop, spread into the plurality of users who wanted to share their

[291] Quoted in M.A. Anastasi: Sony exec. We will beat Napster, August 17 2000. *New York Fair Use*, <http://www.nyfairuse.org/sony.xhtml>.

creations with their friends.[292]

In the wake of the so-called Internet revolution, the music industry completely misunderstood the reconfiguration of culture industries and changing consumer needs and habits. Perceiving every illegal download as a missed sale, one of the world's most powerful industries turned to complaining about the unacceptable misbehavior of users, calling them thieves, creativity killers, criminals, and even terrorists. At the legal level, business executives and lawyers tried to enforce copyright laws and gain compensation payments from users. Looking back at the attacks by the *Recording Industry Association of America* (RIAA) and their equivalents in Europe in recent years, one has the impression that while other industries were trying to adapt to new technologies, the music industry tried to establish monetary punishment as a new business model.

At the level of popular discourse and debate, the music industry bluntly translates unauthorized copying into *theft*, neglecting the fact that if someone steals

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[292] The phenomenon of *MashUp* music became popular in 2001under the name *Bastard Pop*. Artists would mix several hits together to create a new one. Other synonymously used terms were bootleg, bootys, and blends. The music was spread over the Internet on websites such as Boomselection (now discontinued). It became a center for publishing and creating bootlegs, inviting the extensive community to upload their best blends of various pop songs. Since the production existed in a gray area from the outset, bootlegs sales were not possible, and commercial benefits wereonly possible in the many so-called Bastard Pop or Mash Up parties. Nevertheless, mainstream media like the BBC and other radio stations didn't waste time to start hosting their own sessions, featuring Bastard Pop, and a major label, Rough Trade, released a CD compilation on the subject. Major-label artist Madonna offered audio files for downloading from her website and organized a remix contest. The Hip Hop artist Jay Z released the vocals of his album The Black Album for remix. DJ Dangermouse's *The Grey Album*, a blend of *The Black Album* and The Beatles' *White Album*, received worldwide attention. The Kleptones' album *A Night at the Hip Hopera* tells the story of rock music using countless samples from well-known rock bands such as Queen. The album *As Heard on Radio Soulwax, Part 2*, released by the Belgian brothers David and Stephen Dewaele as 2ManyDJs, is considered a landmark production in MashUp music and DJ culture. The examples of Bastard Pop or Bootleg Music show how a phenomenon that already has been part of music culture can spread into new communities of listeners, but they also present new, actively contributing participants. Due to copyright regulations, it inevitably landed in a gray market and could only be distributed in small vinyl editions, radio shows, and dance events in the club culture.
See Rojas, Pete, *Bootleg Culture*, in Salon.com, August 1 2002, online: <http://dir.salon.com/story/tech/feature/2002/08/01/bootlegs/index.html>.
See also: Miller, Paul D. 2004. *Rhythm Science*, Cambridge, MA: MIT Press.
Miller, also known as DJ Spooky, provides an informative and insightful account of the practice and tradition of collage, remixing, and re-use in DJ Culture.

a purse, the purse is actually taken away from its owner, whereas a file that is copied does not disappear. The most frequently aired recent anti-piracy advertisements in movie theaters and on DVDs shows someone stealing a handbag, breaking into a car, or shoplifting, and the subtitle confronts the viewer with: "you wouldn't steal". Between the short scenes depicting theft, a girl sits in front of a computer watching a file downloading. This parallel is clearly equating downloading a movie with theft.[293] From another perspective, however, one could say that, the scarcity that determined business models in the age of mechanical reproduction is simply no longer appropriate for the age of electronic distribution. The strategy of labeling all copying by common users as piracy has been counterproductive in the sense that it has blurred all distinctions between common users and professional copyright piracy.[294] Equating downloads with theft and brutal street robbery has not been widely accepted by audiences of the music and film industries, who in fact see a conflict between their common sense perception of copying for private purposes, and the severity of legal actions against downloaders.[295]

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[293] In the early 1990s the Software Publishers Association promoted a video *Don't copy that Floppy* to raise awareness about copyright infringement. The metaphor of theft was already used then, the video calls for fairness towards programmers and their right to get paid for their work. The video appeals to the users' fairness and honesty, not to copy programs and to distribute them, because otherwise they would actually commit theft, exploit the programmers' creativity and eventually destroy the computer industry. The video is posted to the Internet Archive, Don't copy that floppy (Software Publishers Association, 1992), <http://www.archive.org/details/dontcopythatfloppy>.

[294] The metaphor of piracy used for copyright infringement is an interesting discursive actor itself. It seems to provide a rather unclear understanding of what piracy is. Is piracy a danger of navigation, is it the commercial infringement of intellectual copyrights or does it describe users downloading files from the Internet. Furthermore, piracy, and to a far greater extent pirates, commonly carry a connotation of adventure and romantic legend, which was recently emphasized in the popular movie trilogy *Pirates of the Caribbean* (Gore Verbinski USA 2003, 2006, 2007). The file-sharing scene itself embraced the connotation and is using logos and names referring to piracy, as the name and logo of the website The Pirate Bay attests to, as well as the T-shirt of a music tape as skull and crossbones distributed by Downhill-Battle, which reads *Hometaping kills the music industry and is fun*. Such imagery has already been used in the 1980s.
How confusing the initial meaning of skull and crossbones can be indicates the attempt to replace the widely recognized warning sign for poisonous substances through the Mr. Yak symbol, because children understand the skull and crossbones as something funny and interesting, associating it with pirates and not with poison.

[295] Popular media mock the anti-piracy campaigns as well. In the British TV comedy series, *The IT*

Another image often stressed in industry campaigns is that of the *artist* who cannot be creative without the incentive of royalties. However, critics maintain that most of the revenues in the music industry do not go to the original artists, but remain with the major distributors.[296] Both sides make use of scientific research to support their arguments, the music industry claiming that there is proof linking decreasing sales to the increasing use of file-sharing systems and CD-burning (e.g. Siwek 2007).[297] However, other surveys are unable to verify this relation and rather see decreasing sales as being related to changing media consumption habits, such as a general decrease in music consumption and cinema attendance, which has been replaced by an increase of other activities, such as playing computer games, chatting online, etc.[298]

To defend durable copyright laws, positive associations are employed, such as

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Crowd (Ben Fuller, UK 2006), the common anti piracy-clip is exaggerated with depctions of brutal violence and an FBI agent shooting a girl who downloads a movie. A poster in one of the character's flat, Roy, reads: "Home sewing is killing fashion", and later in that episode, while Roy and Moss visit an alleged German cannibal, police are raiding the house. Not because of the cannibal, but to find a copied DVD; The IT Crowd, Season 2, episode 3. For the complex relationship between legislation and the common sense perception of copying see Halpern (2003).

296 See e.g. the supporting statement by a group of distinguished economists (Georg Akerlof, Kenneth Arrow, James M. Buchanan, Ronald Coase, Milton Friedman, et al.) to the US Supreme Court in the case Eldred vs. Ashcroft on an extension of copyright; the economists do not see a significant increase of economic benefit by extending copyright terms, but rather a decrease in innovation through limiting the use of existing material; see statement of the amici curiae in support of petitioners, May 20 2002, <http://cyber.law.harvard.edu/openlaw/eldredvashcroft/supct/amici/economists.pdf>; on Eldred v Ashcroft, see Lawrence Lessig: *How I lost the big one, in Legal Affairs*, March/April 2004, <http://www.legalaffairs.org/issues/March-April-2004/story_lessig_marapr04.msp>.
In 2005 Andrew Gowers conducted a review of intellectual property rights in the UK. The report argues for "reforming copyright law to allow individuals and institutions to use content in ways consistent with the digital age", see Gowers Review of Intellectual Property, <http://www.hm-treasury.gov.uk/media/6/E/pbr06_gowers_report_755.pdf>.

297 Siwek's results seem to contradict other findings, as for instance Oberholzer, and Strumpf (2004), who cannot confirm a significant effect of file sharing on record sales.

298 See also the programmatic text of record industry executive John Snyder, who teamed up with his son Ben Snyder to promote new ways of dealing with the emerging media practice of distributing files online, John Snyder, John; and Ben Snyder: *Embrace File-sharing or Die*, in Salon.com, February 1 2003, <http://dir.salon.com/story/tech/feature/2003/02/01/file_trading_manifesto/index.html>.

art, creativity, the free market, monetary reward as an incentive for invention and creation, the original is better than the copy, a commercial product is more reliable, better maintained, safer, and more trustworthy than one developed in loose collaboration, etc. Simultaneously, negative associations are created to describe the emerging media practice, which is often labeled as communism, piracy, theft, irresponsible, destructive, not creative, stifling creation and invention, and destabilizing industry and employment. These associations are communicated through the many channels the media industry owns and serves, and through public relations efforts at conferences, business fairs, boardroom meetings, public talks, and podium discussions, and they are often supported by consenting newspaper articles. Sponsored teaching material is handed out to schools and teachers for free to teach approaches to copyright issues protecting the interests of film, music, and the software industry.[299] In public-private partnership, the industry's associations sponsor these teaching materials that contain endorsements in the form of prefaces by politicians, who completely disregard the biased information.[300]

Most important to the debate on file-sharing is the significantly new logic of distribution and production. The logic of distribution has changed profoundly as the Napster example illustrates. In that case, participation is not only the sharing of music files among a circle of friends, but also the automated information delegation to a socio-technical ecosystem of information technologies

[299] In Germany, Microsoft sponsored the publication of teaching material on copyright law in the digital age, presenting an unbalanced and inaccurate view on copyright issues and open-source software, a disparaging description of file-sharing and open-source developers, as well as praise for Digital Rights Management. *Rerum. Copyrights im digitalen Zeitalter*, Zeitbild Verlag, 2003, <http://zeitbild-de.academy4.com/files/de/downloads/Copyrights/Lehrermappe_31KopVo.pdf>. A critical review of the teaching material can be found at Thomas Schiller: *Kritik über Rerum Copyrights im digitalen Zeitalter*, <http://www.thomas.xmmx.de/atcpa/pp/Kritik_ueber_RERUM_Copyrights.pdf>.

[300] The German minister for Education and Research, Edelgard Buhlmann, emphasizes in the preface to the above-mentioned teaching material that instructing students on the complex issues of copyright is of the utmost importance. She expresses her hope that the teaching material will increase the conscientious use of media.

and a plurality of users. At the level of the individual user, participation starts with providing a part of the hardware to the system of distributed computing and with uploading files to the total collection. The information system then indexes the files and distributes them according to user requests. With the recent introduction of *BitTorrent* technology, larger files can be distributed much faster. Digitizing media content and sending it through computer networks has become the standard mode of distribution. Media therefore arrive in a format users have begun to increasingly prefer for consumption. Participation in file-sharing goes further on a semantic level. Users exchange opinions on music and films, they recommend different artists to each other, and refer them by linking directly to their works. The monolithic structures of the old media industries could not offer appropriate platforms for such a vast social interaction and would not allow the fast, unbureaucratic, and often unpaid distribution of files. And they have missed out on the opportunity to offer anything that even comes close to resembling this media practice.[301]

At the production level, new technologies make the production of music cheaper. Producing music, especially electronic music, does not require expensive studio time anymore. Many artists are able to produce their entire work in the comfort of their own apartments. But production costs have been decreasing for the music industry as well since the advent of the compact disc, which has not rewarded consumers but instead has required them to pay higher prices for content that had simply been re-released in the new formats.[302]

[301] However, the Motion Picture Association of America (MPAA) came to an understanding with BitTorrent.com to prevent the unlicensed distribution of intellectual property produced by member companies of the MPAA. BitTorrent.com agreed to filter files that might infringe copyright law. In general, the distribution method of peer-to-peer file sharing can also be used for commercial and legal distribution.
See, Burt Helm: *BitTorrent Goes Hollywood. Once the choice of movie pirates, BitTorrent will now help Warner Bros. sell its films and TV shows*, May 9 2006, *Business Week,* <www.businessweek.com/technology/content/may2006/tc20060508_693082.htm>.

[302] This is the logic of re-releasing material from the archives that the Hollywood film industry has practiced successfully for a long time. First by selling films that were no longer distributed to television networks, and then by releasing films on videotape, and later on DVD.

Interestingly enough, responses to the challenge of digital distribution resulted in only a few attempts to provide alternative and legal download possibilities, which generally failed because boards of directors in the big music businesses were too hesitant. Fearing they would lose control over their catalogs by licensing them to a new distribution method, music publishers missed the opportunity to make a timely entrance into an emerging market and helplessly witnessed the rapid diffusion and encouragement of an alternative distribution practice. A significant portion of the existing music industry's catalogs have meanwhile been spread by means of the emerging networks of peer-to-peer file-sharing. Furthermore, these networks developed a source for music and films that is hardly available or completely unavailable through official distribution channels.[303] The success of online distribution, but also of remixing and electronic music production, is based on the qualities of digitized music. It makes it very similar to the qualities that have been identified for software (see Chapter 3). Music appears to be as modular as software: It is as easy to distribute, and the accumulating resource of existing music provides a vast archive of modules (called samples) to use and re-use for new productions (Hughes, Lang 2006). Editing software made the remixing of music files easier, and even users lacking the skills are able to scatter their humble productions over the web.

In response to the emerging media practice, the music industry fought on the legal level as well as on the technical one. The legal crusade of the movie and film industries began by adapting the copyright law in 1998,which resulted in the Digital Millennium Copyright Act (DMCA), which has been widely discussed and criticized (e.g. Vaidhyanathan 2001; Lessig 2001:187-188; Lessig

[303] The Berlin based initiative Pirate Cinema organizes hosts film screenings of hard to find movies or movies that violate copyrights. As Sebastian Lütgert points out, the main objective of these screenings is "not quality but availability". Consequently the organizers provide the movies as download to go.
<http://piratecinema.org/>.

2004:157-161; Benkler 2006).[304] Suing mothers, harassing teenagers, pushing universities to filter their Internet traffic or turn over their students to authorities, and confronting suspected file-sharers with incredible penal fees, shaped the public image of the contemporary music industry. At a technical level, the battleground witnessed the flushing of file-sharing systems with corrupted music files.[305] Poorly advised pop star Madonna lent vocals to a fake file pretending to be one of her songs, but when played the user would hear her say "What the fuck do you think you're doing?" In response, her website was hacked with a message reading: "This is what the fuck I think I'm doing", displaying links to download all songs from her album *American Life*.[306] According to the emerging media practice her vocals were used for remixes that were distributed online.[307]

Another strategy used by the music and movie industry was to set up so-called *honeypots*, servers that offer content for illegal downloading. In order to get the IP addresses of users downloading and spreading content, the music and movie industry started to distribute their own content in bogus ways.[308] The work was

[304] See also the Electronic Frontier Foundation's evaluation of the DMCA: *Unintended Consequences, 7 Years under the DMCA*, April 2006, <http://www.eff.org/wp/unintended-consequences-seven-years-under-dmca>.

[305] Companies such as Overpeer were inundated by orders from music companies and industry associations to flood peer-to-peer networks with corrupted files. In order to do so, they set up fake networks of virtual file-sharers to distribute the corrupted files. As Thomas Mennecke argues, these efforts consequently led to the development of safer, less corruptable file-sharing protocols, such as BitTorrent and eDonkey. Due to its inefficiency, Overpeer was discontinued in 2005 after three years of anti-P2P activities. See, Thomas Mennecke: *End of the road for Overpeer*, Slyck News, December 10 2005, <http://www.slyck.com/story1019.html>.

[306] Ashlee Vance: Like A Virgin – Madonna hacked for the first time, in The Register, April 22nd 2003, http://<www.theregister.co.uk/2003/04/22/like_a_virgin_madonna_hacked>. Other acts in response to the industry's attempt to fight online sharing and the remixing of movie and music files include several hackings of the RIAA's website and defacing it with pro-file-sharing statements.

[307] Initiated by Miriam Rainsford, aka iriXx, the Madonna Remix Project protested "against the lockdown of digital technology", see The Madonna Remix Project, Press Release, April 30 2003, <http://www.irixx.org/madonna/pressrelease.txt>; the remixes are hosted at the Internet Archive: WTF? The Madonna Remix Project, <http://www.archive.org/details/wtf_mrp_mp3>.

[308] An eyewitness account of the inner working mechanisms of *FXP groups* and *ftp fillers* and the involvement of the German Federation against Copyright Theft (Gesellschaft zur Verfolgung von

done by dubious companies often employing former members of the police. Such social connections also enable the industry to work closely together with the authorities and often even accompany the police on raids against individuals suspected of piracy and copyright infringement. Due to a lack of competence in this matter, the authorities often cooperate with the industry's agents and even allow them to evaluate confiscated material. The entire matter has been extensively described and criticized by the German computer magazine c't.[309]

In another attempt to respond to the challenge of uncontrolled digital distribution the movie and music industries exerted pressure on the so-called *Digital Rights Management* (DRM) or *Trusted Computing* (TC).[310]

The latter was coined and primarily supported by the Microsoft Corporation to battle software piracy and to provide a means for authentic user identification. DRM, dubbed by critics as *Digital Restriction Management*, involves techniques to limit the ability to copy and play media content. These technologies are directly

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Urheberrechtsverletzungen, GVU) is provided by Dierks, Oliver (2005), *Undercover. Einblicke in die Arbeit eines verdeckten Ermittlers der Gesellschaft zur Verfolgung von Urheberrechtsverletzungen e.V. (GVU)*, Münster: MV-Verlag. Dierks infiltrated the scene of release groups and FXP communities. By order of the GVU, he collected evidence and set up honeypot servers on which he flashed content provided by the GVU. In 2006 the GVU received some media attention when authorities raided their offices, and prosecutors accused the federation to have actively participated in copyright infringement and thr distribution of copyrighted material. Heise News, *GVU soll Raubkopierer gesponsert haben*, January 24 2006, online: <http://www.heise.de/newsticker/meldung/68760>.

309 Holger Bleich: *Vorverurteilt. Staatsanwaltschaft glaubt Urheberrechtsvertretern blind*. c't 2006, No. 22:102.
Holger Bleich, Volker Briegleb: *Die Hilfssheriffs als heimliche Komplizen. Fahnder der GVU sponserten Film-Raubkopierer*. c't 2006, No. 4:18.
Holger Bleich: *Warez vom Staatsanwalt. Mit dubiosen Methoden gegen Releasegroups*, c't 2007, No. 24:52

310 *Digital Right Management* describes regulation and use of media content as applied by copyright holders in order to control and limit distribution and frequency of use of digital artifacts. DRM systems can imply digital watermarks to identify individual copies, product activation, encryption and copy protection.
Trusted Computing describes the attempt to identify individual computer users. The concept involves product activation, personalization of hardware and operating system, an individual IP address.

aimed at limiting the affordances of digital artifacts, as described in Chapter 3. In a world where electronic computers by definition rely on copying processes, the movie and music industries intended to reintroduce the original in the form of massively produced but individually signed and identifiable copies. Effective DRM is impossible to achieve on an exclusively technical level; it requires enforcement on the legal level as well (Bechtold 2003). Not only have all encryption and copy protection systems been hacked quickly, the industry also failed to deliver products that customers could play without encountering additional problems. Many CD and DVD drives refuse to play copy-protected data carriers, precisely because "playing" involves "copying". DRM prevents the possibility of playing files on different players, such as a portable MP3 player or a computer. The biggest failure in the many embarrassing attempts to cope with the new technologies can be attributed to Sony, who distributed music CDs that secretly installed a rootkit on users' computers. Similar to a Trojan horse, the rootkit works invisibly in the background but offers third parties the possibility of monitoring and even taking control of the infected machine.[311] When IT security specialist Mark Russinovich blew the whistle on Sony in October 2005, they aggravated the scandal by offering an deinstalling program that actually installed additional surveillance features.[312] The disgrace reached its height when it was revealed that the copy protection software was itself infringing copyrights by using open-source code.[313] Although only customers from the US and

[311] A list with CDs containing the rootkit was provided by the Electronic Frontier Foundation, online at: <http://www.eff.org/deeplinks/2005/11/are-you-infected-sony-bmgs-rootkit>.
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[312] For Mark Russinovich's blog entry disclosing the rootkit see *Sony and Rootkits: Digital Rights Management Gone Too Far*, October 31 2005 online: <http://blogs.technet.com/markrussinovich/archive/2005/10/31/sony-rootkits-and-digital-rights-management-gone-too-far.aspx>.
For the blog entry concerning the uninstaller see *Sony: You don't reeeeaaaally want to uninstall, do you?*, <http://blogs.technet.com/markrussinovich/archive/2005/11/09/sony-you-don-t-reeeeaaaally-want-to-uninstall-do-you.aspx>.

[313] The news appeared on the Dutch website *Webwereld*. Brenno de Winter, *Spyware Sony lijkt auteursrechten te schenden*, Webwereld, November 10 2005, <http://webwereld.nl/articles/38285>. It was then spread by Slashdot, where an English translation was also posted;, <http://yro.slashdot.org/yro/05/11/15/1250229.shtml?tid=117&tid=188&tid=17>.

Mexico were affected, the scandal made mainstream news in Europe as well. In addition to several law suits and a recall of the affected products, Sony BMG suffered significant damage to its image and reputation.[314] These examples also indicate that a strict enforcement of copyright law inevitably invades citizen privacy and therefore constitutes a means of repression.

The absence of legal and affordable download possibilities and the concerted actions of movie and record industry associations and copyright-holding companies probably even encouraged file-sharing. The movie and music industries might have underestimated the impact of their aggressive actions. Due to an obvious misunderstanding of consumer needs, the qualities of digital technology, and their difficulty to adapt their business model accordingly, these industries have caused themselves considerable harm. All successful online music services are provided by companies which do not originate from the established music industry. Through their incompetence to communicate their interests and concerns to audiences, these huge industries are now estranged from their former target audiences. As Lawrence Lessig argued in a *Ted Tech Talk* in 2007, these actions may very well be responsible for a skeptical attitude towards the law, because young users start to view the law as wrong and learn to live with what are considered illegal activities.[315] The legal actions of the music industry are in complete contradiction with a common sense of justice. The industry's adversarial actions infused music consumption with an emotional element that is not only felt among file-sharers but which is also evident in the netlabel scene, which distributes their own productions free of charge. The

[314] In March 2008 Sony BMG again made news as a copyright thief when a small software company called Point Dev filed a lawsuit for using an unlicensed version of their administration software tools. Allegedly the Business Software Alliance estimates a percentage of 47% pirated software at Sony BMG. See, Slashdot: *Sony BMG sued for using pirated software*, at Slashdot, March 30 2008, <http://yro.slashdot.org/article.pl?sid=08/03/30/1856232&from=rss>.

[315] Lawrence Lessig, How creativity is being strangled by the law, TED talks, 2007, <http://www.ted.com/talks/view/id/187>.

German netlabel *Ideology* called its label sampler *Never Mind the Industry*.[316] The non-profit organization Downhill-*Battle* argues that the four major record labels actually form a monopoly, controlling the market and attempting to control digital distribution as well. The plans of the major labels to stop the use of file-sharing protocols by filtering on the Internet Service Provider can be countered by the argument that file-sharing actually increases the visibility of independent artists. That file-sharing does not necessarily harm music sale revenues is evident from successful businesses like *CD Baby*, *eMusic*, *Beatport*, *FineTunes*, and others. The above-mentioned distributors all sell their music files without any DRM or watermark. As opposed to the rather homogeneous hits of the music industry, these vendors focus on specializing in a variety of independent music and newcomers, and they use the advantages of digital distribution to limit costs and consequently have no need for large corporations with bloated administration and expensive marketing, and in addition their artists even benefit from higher provisions.

The social use of technology and media becomes clearly visible in the confrontation they provoke. The disputes resulting from media practice and technology's material aspects can be perceived as a process of negotiation. It is part of an implementation process of technology into society. The confrontations described above are obviously suitable for media attention. There can be no doubt that media practices are raising socio-political issues and triggering emotional responses. Indeed, their ideological overtone represents social issues and debates. Although confrontations are often highly visible and therefore appealing for describing the collision of old media industries and the new media practice, and although they lend themselves well to making the David vs.

[316] The website of the netlabel Ideology says:"So, why record-stores? Why collecting-societies and distributors? Why the n-th copy of your average pop-trash? Why launch-parties with champagne and caviar-appetizers? Does music need an industry? Or does an industry merely use music? Start the download ... and decide for yourselves." *Never Mind The Industry* <http://www.ideology.de/archives/audio000121.php>.

Goliath comparison, a critical view of the culture industries' achievements in using the media practices for extending their revenues is necessary. The dynamic of confrontation describes a conservative reaction to user participation and technology appropriation. It is opposed to change and seeks to foster old traditions through legal protection, and consequently constitutes a permanent threat to innovation and technological advancement, as well as to social change. The new media practice creates new business opportunities that result in a very different perception of participation. Here, the culture industry implements user activities into new services. Instead of colliding with users, the appropriation of technology design channels user activities. This view will be discussed in terms of *implementation* in the following section.

5.2 Implementation: designing participation

The emerging media practice was celebrated as the rise of consumers, who would become users and producers, emancipated from the tyranny of being limited to simply consume what the media giants were broadcasting. The question, however is to what extent users have actually been able to free themselves from the culture industry? Or, conversely, in how far have enterprises succeed in incorporating users' media practices into new business models? Despite all the enthusiasm for users as producers and for user-generated content, as propagated, for instance, by the *Time* magazine's nomination of the user as the person of the year in 2006, the question of whether power relations have really shifted or whether, on the contrary, existing structures of production and distribution have simply been adapted to new forms of practices still needs to be answered. The previous section described how new media practices and conventional business models have collided, causing different forms of *confrontation* resulting from the social use of computer technology, software, and the Internet. This section on the *implementation* of user activities will argue that it is in fact possible to take advantage of several of the previously discussed media practices and simultaneously channel user activities by means of graphical user interfaces and software design. Implementation describes how the conventional culture industry and new emerging businesses in the field managed to take advantage of media practices afforded, and resources provided by the Internet. Companies have acknowledged the user activities described in previous chapters in terms of *accumulation*, *construction*, and *archiving*, and instead of fighting them, they offer services, production means, and infrastructures to facilitate these user actions. Implementation here literally means implementing user activities in the software design of an application and employing user participation for commercial purposes often without acknowledging their labor.

The game industry was among the first to take advantage of the fan's labor and started to stimulate the construction of additional levels in computer games or the modification of entire games (Nieborg 2005). The *Xbox 360* is the result of a process of implementation too. Not only has Microsoft adopted many of the design suggestions that were realized thanks to homebrew software in the graphical interface and design of the Xbox 360, but the company has also devised a strategy to regulate the practice of homebrew software by providing an integrated development kit.

Fans and the labor they perform on media texts can in fact be easily implemented into the production logic of the media industry. Once corporations producing media texts learn that the activities of fans and users actually benefit their original products, and that they are easy to stimulate and to exploit, it's but a small step to grant users a certain degree of cultural freedom. In return, the creativity of users will be controlled, and all rights to commercial utilization will be reserved for the corporations.

New services provide platforms for self-representation, social networking, and publishing websites (e.g. *MySpace*, *Facebook*, *Friendster*, *Blogger*, etc.), infrastructures for storing and distributing files (e.g. *Rapidshare*, *Megaupload*), selling possessions (e.g. *eBay*), publishing photos (e.g. *Flickr*, *Photobucket*) and videos (e.g. *Google Video*, *YouTube*), or a means to modify commercial media texts as level editors for computer games (e.g. *Unreal Tournament*) and movies (*Star Wars MashUp*). In all cases, the offered services or production means revolve around the (generally unpaid and unacknowledged) labor of users, who modify media texts, create content, or distribute it. It characterizes a shift in culture industries from creating media content for consumption towards providing platforms where content is created either by users or where copyright-protected material is modified according to the platform provider's terms.

Implementing user activities takes place as explicit participation by providing interfaces for creating media texts like the Star Wars MashUp does. Here, users explicitly

use the cultural resource of the copyright owner for remixing media texts and creating new ones. It takes place as a form of implicit participation in socio-technical ecosystems such as Flickr, where user activities improve information management for the Yahoo search engine. The following case examples exemplify the dynamic of implementation as it is unfolding on a web platform such as StarWars MashUp, where corporate content is remixed by users. Online hosting services, such as Rapidshare, do not offer corporate content to create user created remixes, but offer an infrastructure that invites users to share files. Web 2.0 applications such as Flickr, Facebook, Twitter, Delicious show a high degree of formalizing user activities as default design setting.

Figure 17 shows a list of platforms that have successfully implemented user activities and whose technical design (software) and legal design, defined by the software licenses as the *terms of use,* and *EULA* (End User License Agreement) channel user activities.[317]

[317] The terms of use and end-user license agreements are not negotiable. By default the user has either to accept the overall 'agreement" or to abstain from installing the software or using the services.

Platform	Kind of Platform	User Activities (labor)	Elements of Control
Star Wars Mash Up (Lucas Film).	Fan site, providing tools for creating Star Wars-related content.	Producing media content (movies, images).	Creation and presentation limited to the platform's interface, filters nudity; all user creations belong to Lucas Film.
Second Life (Linden Labs).	Virtual World (paid and unpaid accounts).	Producing virtually all content from clothes, to houses, enterprises, and community building.	User may earn money in the SL infrastructure.
Facebook.	Social Networking Site.	Providing personal data useful for market research and advertising, creating applications, building groups...	API allows MashUps and application integration; right to exclude users without notification or explanation.
Flickr (Yahoo!).	Photo storing/sharing.	Uploading images; creating meta-information, building groups, establishing networks.	API allows MashUps; right to exclude users without notification or explanation. Regulating pornography. Censorship.
Delicious (Yahoo!).	Bookmark storing / sharing.	Posting private/public links, creating meta-information, building groups / networks.	API allows MashUps.
YouTube (Fox).	Video storing /sharing.	Providing videos, producing click rates, meta-information, ratings, comments, building channels and groups.	API allows MashUps; right to exclude inappropriate or copyright-protected material, excluding pornography.
Twitter.	Micro-blogging.	Providing posts, building networks.	API allows MashUps.
Rapidshare	Online hosting service	Uploading and sharing files	Control of uploaded content, claims to ban copyright infringements.

Fig. 17; Web platforms and generating value through users, control through service providers

Trapped on Death Star. Let the fans do the work

For years the very successful fan platform *TheForce.net* has been one of the main websites for *Star Wars* fans to share the enthusiasm about the movies and to engage in the production of fan films.[318] They have always been wary of lawsuits being filed by the *Lucasfilm* corporation. Comments in their web forum maintained that as long as they didn't earn any money with their homemade movies they wouldn't get sued. In fact, the fan forum was always to the benefit of Star Wars since the website and the fan productions heightened credibility and encouraged enthusiasm in a way the corporate communication machine was unable to. The Star Wars theme appeared in all kind of media texts. A group of *Unreal Tournament* gamers participated in the 2003 *Make Something Unreal Contest* with a Star Wars mod and was ranked among the finalists, the winner of which would be awarded a prize of $1,000,000. Lucasfilm subsidiary *LucasArts* allowed the group to continue to participate in the competition and keep the prize money if they won.[319] The strategy of Lucasfilm was rather unclear and frequently limited to letting the fans do whatever they wanted to do as long as they could not generate any revenues. In 2007, *LucasArts* seemed to adopt a strategy of implementation and announced that people could use images from the Star Wars movies to produce remixes and upload their work to the corporate website *Starwars.com*. Although Lucasfilm announced this as a huge concession to fans, the cultural freedom granted by the copyright holder is of course strictly regulated and shows how the implementation of participation is related to the technical design and legal level of discourse. By providing an easy-to-use editing software, they already incorporated certain aspects of the ostensible appropriation. The *Eyespot* editing software prevented nudity and pornography in the remixes. Furthermore, the selection of Star Wars movie samples

[318] The force.net is probably the biggest unofficial Star Wars fan site with 229,000 registered members and more than 20 million postings on the forums. The forum is the most frequently visited section of the website, attracting 57% of the users. Sources: Big-Boards.com and Alexa.com on September 3 2007.

[319] The Unreal Tournament mod *Troopers* can be downloaded at <www.ut2003troopers.com>.

offered by Lucasfilm were only available in streaming format, as are the final fan-made productions, in order to prevent users from downloading and reworking the samples in other media editors or posting them elsewhere. A centralization of control was achieved by limiting the right to upload to the corporate website only, where the editing policies were enforced by a team pre-screening every fan-made Star Wars movie before it got published.[320] Uploads to other websites were simply banned. The Star Wars example provides a clever, easily applicable model for media industries to establish tighter bonds between their products and their consumers. Having recognized that the creativity of users is actually helping them to increase their revenues and maybe even to polish their image damaged by lawsuits and cease-and-desist letters, Lucasfilm protected their interests in a more subtle way and shifted from controlling the original media text to channeling fan labor and preventing them from participating in potential revenues.[321] The editing technology is crucial in this relation. Providing a tool that is far simpler than many movie editors, the copyright owner can attract more and less skilled users, and simultaneously maintain control by imposing the discursive design of the movie editor on the users. The advantage for Lucasfilm is that it can in fact stay in business without having to ever produce another Star War's episode. The fans continue feeding the saga and in order to do so have to use the resources and means provided by Lucasfilm and, moreover, they create meaningful community activities, entertaining movies, images, and promote Star Wars merchandising. As Lawrence Lessig rightly asserts, this form of user participation is in fact degrading the user, who thus is turned into "the sharecropper of the digital age".[322] At a legal level, exclusive rights

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320 Sarah McBride: Make-it-Yourself Star Wars, in Wall Street Journal, 24th May 2007, <http://online.wsj.com/article/SB117997273760812981.html>.

321 Eyespot's relations with *Tremor Media*, an in-streaming-media advertiser, and *Audible Magic*, a company specialized in copyright protection, might explain why content is not allowed on sites other than the Star Wars platform. LucasFilm can only advertise and apply copyright protection if they have complete control over the user-generated content.
Eyespots own media platform offers a very different model and its terms of use are in marked contrast to those of the Star Wars platform. Check: <www.eyspot.com>.

322 Lawrence Lessig: Lucasfilm's Phantom Menace, in The Washington Post, 12 July 2007, online:

to fan-made productions are granted to Lucasfilm, allowing them to exploit the labor in any form whatsoever without any compensation to the creator. The terms of use stipulate that "Lucas grants you a non-exclusive, non-transferable, revocable, limited right and license to access and use the *Star Wars* Supplied Materials solely for the purpose of mixing the *Star Wars* Supplied Materials with Your Posted Material," and the user in return agrees to grant "Lucas, its licensees, successors and affiliates a perpetual and irrevocable, exclusive, royalty free, worldwide license in all rights, titles and interests of every kind and nature".[323]

The example of Lucasfilm demonstrates that the culture industry is in fact capable to shift from creating media content to providing platforms for using existing content or creating user-generated content. The practice of remixing, changing, and altering existing media content by fans is implemented into a proprietary platform that channels these user activities and ties them to the strict regulations of the content provider. The media texts form a resource from which users can draw the raw materials for their own media creations. However, all their labor and creativity is subject to the copyright holder's regulations, not only with respect to commercial aspects, but also with respect to control and censorship banning unwanted user creations. Users and fans become unpaid co-workers using their creativity and imagination to extend, further develop, and market the original product. The commercial rights are completely in the hands of the corporation, who has no obligation whatsoever to compensate the creators nor respect their moral rights. A professed openness is used to grant access to the original text, but only according to defined terms of use and always without the possibility of benefiting themselves by putting their creations to commercial use.

<http://www.washingtonpost.com/wp-dyn/content/article/2007/07/11/AR2007071101996_pf.html> (retrieved, August 2007).

[323] Section c and e of Lucasfilm's *Star Wars MashUps* Terms of Service, <http://starwars.com/welcome/about/mashup-copyright> (retrieved August 2007).

Hosting File Sharing, Thriving on Piracy

Services such as *Rapidshare* or *Megaupload* facilitate the distribution of large files, and are described as *one-click hosting services*.[324] Revenues are generated through advertisement and premium accounts, but all the distributed content is completely uploaded by users. Many of these services implicitly take advantage of the practice of file-sharing and copyright infringement. Although their terms of use do not condone it, a large part of the stored files are distributed illegally.[325] The fact that Rapidshare and Megaupload ranked among the top 20 websites in the *Alexa Global 500* list, not only indicates the popularity of online file-storing and sharing, but also that the large numbers of users generating this traffic require a solid, infrastructure that also needs ample funding for covering traffic costs. In August 2007, Rapidshare announced a total of 3.5 petabytes disk space and 140 GB/s of Internet bandwith.[326]

A crucial aspect in the popularity of one-click hosting services are the easy-to-use interfaces. It seems much more convenient to use the conventional web interfaces for uploading files than to run a search for bittorrents and using bittorrent clients in the first place. Although file-sharing systems are popular, users have to be aware of the high occurrence of computer viruses and damaged or false files. In sharing communities, for instance on user forums or boards revolving around a certain topic, an atmosphere of trust encourages the use of posted links to hosting services, because users can assume the posted file

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[324] These services have become very popular since 2005, and along with Rapidshare and Megaupload, the most popular one-click hosting services, An incomplete list on Wikipedia lists 142 other providers in August 2007, Wikipedia: Comparison of one-click hosters, <http://en.wikipedia.org/wiki/Comparison_of_one-click_hosters> (August 31 2007).

[325] Due to a lawsuit filed by a German organization to maintain and protect copyrights, Rapidshare implemented an extremely strict policy and is immediately deleting files that may violate copyrights.

[326] According to the Rapidshare website news section as for August 6th 2007, <http://web.archive.org/web/20070814115534/rapidshare.com/en/news.html> (retrieved from Archive.org). A year later the Rapidshare provdes a 240 GB/s Internet bandwith and a storage capacity of 4.5 petabyte, <http://rapidshare.com/en/news.html>, for comparison, Google used 20 up to 200 petabyte disk space in August 2007.

is valid and not corrupted. If links refer to corrupted or fraudulent files, other members will issue a warning, and the moderators will remove the post. Although many of the posted movie and audio files on hosting services might violate copyright laws, one has to keep in mind that again it is the labor of users that makes these services possible in the first place. Users produce (either in the form of homemade or ripped content) files, upload them, and share the links with their peers. There are entire websites dedicated to indexing the contents of the various share-hosting services and organizing them according to the content in links into e-books, audio files, and movie files. Indexing and archiving becomes a key user activity in that respect.[327] The share-hosting provider merely offers the infrastructure for the easy uploading and exchange of files, but around they constitute the emergence of an entire socio-technical ecosystem of many different related websites and web forums.[328]

The service provider earns money through from paid accounts fees or from advertising revenues. The design of the web service stimulates users to sign up, because for the free downloads there are with annoyingly long waiting times and file limitations, as well as large amounts of advertisement pop ups. It has to be acknowledged that the easy availability of large numbers of copyrighted files is an incentive to use the service. Once again,an infrastructure is provided and the contents distributed on it draw from the resources of the culture industries. Many share-hosting services thrive on the popularity of file exchange, which in many cases infringes copyright laws.

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[327] Web sites providing search engines for files posted to various one-click hosters are among others, Filefield <www.filefield.net>; Filestube <www.filestube.com>; Filesbot <www.filesbot.com>; Loadingvault (Rapidsharefilms.com <http://rapidsharefilms.com/>; Rapidfox <www.rapidfox.com>; Rapidgoogle <www.rapidgoogle.com>, Rsdown <www.rsdown.com>; Rapidsharefilms.com <http://rapidsharefilms.com/>; Search.jrfreelancer.com, <http://search.jrfreelancer.com>.

[328] See also Janko Roettgers, "Piracy Beyond P2P", online article, NewTeeVee, June 17 2007, online: <http://newteevee.com/2007/06/17/one-click-hosters>.

Participation inside: the Web 2.0

Another significant shift has taken place in the culture industry. Instead of the creation of media texts, providing design and platforms for users to create content becomes their core competence. Designing an information management system that is suited for implementing popular user activities and attracting a large numbers of users, seems to be a main objective of this new culture industry business model. Interestingly, the latest development of technologies, referred to as Web 2.0, were celebrated as highly participative and encouraging, enabling the user to make a difference in cultural production (e.g. Anderson 2006; Tapscott, Williams 2006; Leadbeater, Miller 2004). An overtone of social progress and an expectation of increasing consumer participation in the culture industries is discernible in the enthusiastic accounts on the subject, which often coin or take up metaphors such as *social bookmarking*, *folksonomies*, *social software*, *collective intelligence*, and *user-led production*. The obvious production of media content by users and their even more profound participation in commenting, remixing, changing, and distributing media content from established production channels led to a plethora of texts praising the enormous rise of creation.

The often neglected point is the role technology plays in assisting the performance of user activities through easy-to-use interfaces and offering handy applications for integrating data created and posted on one platform into another one. Designers seek to implement services from other providers as well by taking advantage of Application Programming Interfaces (APIs). It is possible for users to implement their Flickr photos on the Blogger weblog and to post YouTube videos directly into their weblog articles. This content is then referred from the providing services and the extra traffic for posted videos and photos does not affect the user. As O'Reilly points out *"the value of software is proportional to the scale and dynamism of the data it helps to manage"* (O'Reilly 2005). The managed data do not come from company employees anymore,

who never succeeded to keep up with the enormous need for information and the organization of data. Companies like Amazon, Google, eBay, or Yahoo already used user activities to extend their information database (O'Reilly 2005). In the case of Amazon, users write reviews, post lists of favorite books, evaluate reviews, and even by simply buying books they are contributing to the information system that can provide better recommendation services to others. O'Reilly states that the software design solutions described as Web 2.0 are pushing this goal even further by not only relying on the system-wide database but by incorporating information from other sources as well.

Users can literally implement these services by, for instance, adding buttons to their personal weblogs for information services such as Digg, del.icio.us, and others, thereby offering users the possibility to add this weblog article directly to their personal del.icio.us profiles or to the Digg.com website. In return, their own visibility will be heightened because the search functions in information management systems will recognize the increased frequency of posting. Again the service provides the infrastructure and will only be attractive when it is adopted by large numbers of users. The requirement on software design to dynamically manage large amounts of data is recursive, since the value of these services is proportional to the amount of data available. This will lead to aggressive competition among service providers, who have to buy out their competitors or keep them off the market. Only a few of the major providers with efficient application programming interfaces for inter-connecting their different services will succeed in accumulating the larger user bases.

Increasingly aware of the potential of an *architecture of participation*, culture industry companies seek ways to develop business models around platforms that appeal to large numbers of users their activities. Recognizing users' activities, habits, and needs, leads to services that provide opportunities for social interaction in various degrees, and the production of media texts.[329] The rash of enthusiasm in

[329] A rather old model of implementation can be seen in Yahoo, still the largest search engine in the

popular and scholarly discourses resulted in the somewhat premature claims of the user becoming a producer, without first examining rather important matters such as ownership structures, compensation for labor, questions of copyright and the intellectual property of users, their cultural freedom, and issues of censorship and privacy. Furthermore, the emphasis on user activities neglected the fact that many platforms for user-created content exceed any community-based project in terms of size, user numbers, and maintenance costs. Many of the services of those platforms respond to user activities developed over the past decade, providing cheap or free storage space, easy-to-use interfaces, and a variety of choices to connect to other users or services. In many of these services, previously developed media practices are simplified for a larger number of less skilled users. *Blogger*—purchased by Google in 2003—offers users the possibility of website publishing free of charge. *MySpace*—bought by Rupert Murdoch's News Corporation for $580 million—initially provided web presence for artists and musicians but became more generally popular as a provider of weblog-like websites, used mostly for self-presentation and promotion, as well as for social networking, and it now boasts more than 100 million users. The already described photo-sharing website *Flickr* facilitates a wide range of user actions by providing an infrastructure for publishing and archiving photos online and engaging in social networking. The service was acquired by Yahoo, which subsequently discontinued its previous photo service *Yahoo! Photo*. Flickr reportedly stores approximately a billion photos. In online video services, such as *YouTube*, users upload videos and rate them using comments or the rating system inherent in the web interface, and in social network services like *Orkut* (developed by Google), *Facebook*, *Friendster*, *LinkedIn*, or *hi5* users create personal profiles and refer them to their friends, family, colleagues, and acquaintances. All these platforms provide an infrastructure and an organized information management system, but content and social interaction are completely generated

US, but along with search results providing a platform for debate, discussion groups and user forums for all kind of issues. The model of providing a platform, an infrastructure and even some means of production became even more popular with the latest development called Web 2.0.

by users, who in return for their labor usually receive little more than limited free accounts. The communities attracted to these platforms at the same time increase their value, because as more users contribute to them and create more possibilities for interaction, more value is generated for these platforms, either for potential use, advertising purposes, or for selling paid accounts.

The mentioned websites are all frequently acclaimed examples of the so-called Web 2.0 and were embraced by the enthusiasts in popular discourse as yet another set of enabling technologies culminating in the nomination of the user by *Time* magazine as "the hero of the Information Age". A closer look at these sites reveals another dimension of their success. All mentioned sites belong to the top-30 websites in the world according to the Alexa ranking and are mostly owned by large corporations.[330] Interestingly, *Wikipedia* is the only non-profit website among the top-ten in the Alexa Global 500.

Most of the websites are owned by large corporations or otherwise benefit from significant investments from a large corporation.[331] Many require a sophisticated infrastructure for administration, marketing and promotion, and for the technology itself. In the case of websites like Photobucket, Flickr, Rapidshare and Megashare, and most significantly YouTube and Google Video, the scale of the online traffic and the hosting capacity is only affordable for enterprises with significant financial backing. The estimated traffic costs of Google subsidiary YouTube are in the region of $30 million a month, which accounts for only 3% of the total operating costs of $11.5 billion that Google spent in 2007.[332] The "industrial" scale of these services are not only evident in the large user groups and the content generated, which frequently captures the media's attention, but also in their technical capacity for

[330] Alexa is one of the leading companies measuring Internet traffic. Although their service has been criticized for its methodology and the lack of accurateness of its sample group, the Alexa results indicate to a certain extent the popularity of a website.

[331] In September 2007, Microsoft invested $246 million in Facebook.

[332] Yi-Win Yen, *YouTube looks for the money clip*, Fortune, March 25 2008, online: <http://techland.blogs.fortune.cnn.com/2008/03/25/youtube-looks-for-the-money-clip>.

bandwidth, downloads, and uploads, and in their sheer presence on the Internet. YouTube occupies a Google *page rank* of 8 out of 10, thus ranking high and having its service implemented in the websites of a large number of users just by linking to YouTube when posting YouTube videos on their sites or referring to them on YouTube. In quantitative terms, those services attain numbers that by far exceed the audience of broadcast media. YouTube reported 100 million video views per day in 2006 and it is estimated that 79 million users watched 3 billion videos in January 2008.[333] Facebook claims to have more than 97 million users, its competitor Orkut, owned by Google and popular in South America, has more than 100 million users, which is close to MySpace's 110 million registered users, and in the relatively small Netherlands an astonishing 49% of the population is registered with the local social networking site *Hyves*.

Another matter of scale is the capitalization capacity of these sites. In the meantime, major media industry players have acquired most of them for large sums of money, banking on future revenues and synergy effects for vertical industry organization by attracting large communities. One can expect a process of concentration in this domain only the big platforms, with large user communities and many databases, have a chance of successfully retaining their communities and stimulating them to produce content. Google purchased YouTube for a phenomenal $1.65 billion, and Murdoch's News Corporation paid $580 million for MySpace, while Facebook has allegedly turned down a $750 million offer by Google. Although many of these deals seem to be a wild bet on a prosperous future and potential revenue models are rather unclear yet, the capitalization leads to an infrastructure and availability of resources that users can benefit from and explore. Google Earth and Google Maps, services providing geographical data, photographic images, and maps of most parts of the planet, allow people to use its data for MashUp sites. Its database forms a resource for many different applications, both commercial and non-profit

[333] Michael Arrington: YouTube's magic number - $ 1,5 million, in TechCrunch, September 21 2006, <http://www.techcrunch.com/2006/09/21/youtubes-magic-number-15-billion>.

or even just for fun. They form an important resource that stimulates an astonishing cultural production which would not be possible if the companies' major funding didn't allow them to benefit from their users' activities for trial-and-error research and as an unpaid resource for research and development. It has been a highly neglected fact that the means for these activities draw upon the enormous financial resources these companies have accumulated. A great deal of the participatory culture thrives on this informal availability of technologies and resources.

What *Time* magazine celebrates as the user's means of production in the so-called Web 2.0 has been described by Tim O'Reilly as an "architecture of participation" (O'Reilly 2005). In this programmatic text, O'Reilly advocates the rigorous implementation of user activities into software design. This development of so-called participatory design ought in fact to raise questions about power and control. To what extent do mechanisms of control find their way into the back-end of the software? One must also ask, to what extent do the free playgrounds companies are offering come at the high price with regard to the back-end politics involved here. After a phase of unquestioned enthusiasm, criticism and doubts have recently been voiced in respect to the brave new Web.[334] The meshed technologies in Web 2.0 applications, the implemented labor of users, and the evaluation of their personal data, social network, and communication through data-mining and profiling raises the issues of privacy and consumer rights (Zimmer 2008, Scholz 2008). The exploitation of user activities on commercial platforms is now criticized as unpaid labor, duping the user in a similar way as the traditional and passive mass media consumer (Bruns 2008:33, Hyde 2006, Petersen 2008, Scholz 2008). Trebor Scholz has pointed out a social dependency these services might create. Since the appeal of most services relies on the number of users contributing to the service and thus facilitating social networks, they make it difficult for individuals to

[334] The online journal First Monday published a special issue on *Critical Perspectives on Web 2.0* in March 2008, edited by Michael Zimmer (2008).

abandon the platform when are dissatisfied with the service or disagree with a change of policies (Scholz 2008). While it is possible to migrate content from one platform to the other, it is much more difficult to transfer the social interaction. Leaving a platform might imply losing the social connections as well.

Socio-technical ecosystems are affected by both the user activities and the intelligence in the application's back-end. Here, the user-generated data are evaluated and processed and maintained for further use. Connected to various databases and through application programming interfaces to many different other applications, the borders of these socio-technical ecosystems are difficult to define. Instead of a black box, the meshed socio-technical ecosystems constitute a black foam, as Bernhard Rieder rightly pointed out with regard to search engines (Rieder 2005). It is unclear to the user where one system ends and the next one starts. The meshed information systems, connected through various application programming interfaces synchronizing data streams, are difficult to differentiate. It is not revealed in the application's terms of use what platform owners and their licensed third parties do with the generated information. The meta-information users generate on Flickr or Del.icio.us, for instance, contribute to search requests on Yahoo and help the company to improve their search engine services (Zimmer 2008). Personal data and private communication user maintain on social networking sites constitute a commodity for the commercial operators of these platforms (Lauer 2008:50). on The opaqueness of the underlying structure easily conceals what is actually happening with generated data and for which purposes they are used, and to which other systems these data are streamed. The inscribed regulations and control mechanisms of data streams and the stored content are hardly recognizable to the end users. They constitute an underlying *protocol of control* (Galloway). The user interactions with services gathering personal information in order to increase an alleged convenience has been already warningly acknowledged as "the proliferation of an increasingly invisible, automated, and autonomous network" (Andrejevic 2002:245).

The connectivity of various data streams is simplified and translated into the graphical user interfaces of Mash-Up editors, allowing users to combine data streams from various sources. Users synchronizing, for instance, different data streams by connecting through the drag-and-drop method the graphical pipes in the Yahoo Pipes interface are actually programming. But thanks to the easy-to-use interface, an operation that used to be a complex task for programmers became largely automatized for lay users. Again the difference between the front-end of an application, such as user interface, and the underlying structure is complex. While users are able to relate different data streams to each other, they have much less insight into the regulation of the underlying data structures. Although they can participate in developing and extending the API, the companies have final control over the API specifications and the database. Through simplification, many interfaces become opaque but actually easier to use, thereby lowering the difficulty level of use, and eventually they participate in cultural production. The facility of producing content using these means is what made the Web 2.0 and its applications such a good story to tell. Neglecting the impact of the underlying structures, it has been perceived exclusively as an enabling technology because it allowed larger numbers of users to do something in an interface and produce anything, from uploading videos, editing media texts, generating personalized data, providing meta-information, or merely generating view and click rates.

The aspect of implementation shows that the range of user activity largely surpasses the domain of explicit participation. One could even state that publishing media texts does not turn users into producers as long as they cannot participate in the revenues these produce, and as long as they have no influence or even insight into the technologies used. Rather, this raises the question to what extent users should actually be perceived as audiences instead.

5.3 Integration: embracing participation

After having described *confrontation* and *implementation* as dynamics growing out of the emerging media practice, *integration* will be discussed as a strategy that arguably aims at responsibly employing user activities. Strategies resulting in confrontation seeks to control user activities through a design that averts appropriation and confining laws that prohibit appropriation. Policies intending to achieve implementation attempt to control user activities through software design and graphical user interfaces, stimulating users to perform activities on corporate platforms and participate implicitly in generating commercial value. The concept of integration, conversly describes a logic of cultural production that adapts cultural values developed in the media practice of collaborative work and the sharing of resources. As opposed to the conventional logic of exploiting a copyright by strictly controlling the use and distribution of media texts, integration, rather, relies on the global dissemination of collaborative work via commonly used resources that are exploited commercially at a local level. The logic of integration ranges from software development and web design to creating and distributing media texts as music, films, or books. It employs many affordances of digital artifacts, such as the modularity of software, the possibility to organize complex programming projects, the collaboration within a globally dispersed community, or the capacity to distribute digitized artifacts at low cost. Integration offers companies the chance to explicitly expand their production into the sphere of consumers and to actively participate in their processes of appropriation. Clearly, Sony missed that chance when Aibopet and a dynamic community of AIBO users started to tweak the little robot dog. Even when Sony withdrew from filing a lawsuit against Aibopet, they never explored the possibility to engage actively with their users. In contrast to this first confrontational and then laissez-faire approach is Google's way of integrating a user community into their software development of *Google Maps* (Rieder 2007).

Google Maps attracted a dynamic community of developers participating in creating MashUps and developing the Google Maps code. Software frameworks like Django, for building web applications, show how a community spread all over the globe collaborates in the development of open-source software that is commercially exploited at a local level where web designers employ the free resource for building customized software solutions. The online music service Last.fm shows how musicians can employ a platform motivated by explicit and implicit participation to promote their music without being part of the major labels marketing and distribution channels. Wikipedia provides another example of integration. Thriving primarily on explicit participation, it developed into a major platform of knowledge creation. Its influential role in the debate on knowledge in the digital age, as well as the controversial appropriation of Wikipedia, requires the Wikimedia Foundation and their diverse community of collaborators to take over responsibility. Integrating an approach to public policy, Wikipedia demonstrates at a technological and social level how to maintain a large cultural resource.

Developing software: Google Maps

Like many other Web 2.0 applications, Google Maps offers an Application Programming Interface (API) to synchronize data from the Google Maps database to other websites. Google Maps provides satellite images or aerial photography, and geographical data for the visualization of maps and navigation processes. Competing technologies of a similar kind are also provided by *Yahoo! Maps* and Microsoft's *Virtual Earth*. The Google Maps API is the most popular application programming interface used in MashUp websites.[335] Users can access the satellite picture database and integrate the geographical visualization into their own web

[335] On the website The Programmable Web, a ranking including 823 different APIs lists the Google Maps API as most popular among 1,485 MashUp websites, followed by Flickr with 365 MashUps, YouTube with 280, and the Amazon eCommerce API with 250 as of July 2008. <http://www.programmableweb.com/apis/directory/1?sort=mashups>.

applications. As Rieder reports, Google established a close collaboration with various developers near and far, actively engaging in their work and providing platforms for communication.[336] The *Google Developers Day* offers them an opportunity to meet with each other in person and to present projects, and a discussion group on Google Groups serves as the main platform for exchange.[337] As a socio-technical ecosystem, Google Maps does not only attract a multitude of lay users, but also communities of expert users and commercial parties employing the resource for their own purposes and building additional infrastructures for development. Independent from Google's corporate structure, many weblogs and platforms dedicated to developing and using the Google Maps API are spread out all across the web.[338] Rieder distinguishes four different layers of expert user participation in the Google API. In terms of database use, users constantly create new definitions and applications of the Google API. On a second level, the user community develops tools and extensions for using the Google API and the database resources. On a third level, expert users engage in the development of the application programming interface itself and report not only bugs to the corporate Google development team, but also come up with new solutions and opportunities for future integration and improvement. On the fourth level, that of

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[336] I draw here from the research conducted by Bernhard Rieder in 2007 on the Google Maps API Group (Rieder 2007). Rieder kindly provided his research notes to the author.

[337] The Google Developer Day 2007 took place at various locations around the globe: <http://code.google.com/events/developerday/2007/index.html>.
The Google Maps API group counts 31,775 members and hosts 126,415 threads as of July 16 2008,
<http://groups-beta.google.com/group/Google-Maps-API>.

[338] Google Maps <http://maps.google.com> and the API <http://maps.google.com> are connected to websites of the developing community, such as the unofficial documentation <http://mapki.com/wiki/Main_Page>, numerous weblogs on Google MashUps, such as Google Maps Mania <http://mapki.com/wiki/Main_Page>, but also to many commercial services, such as Maps24 <http://mapki.com/wiki/Main_Page>, and institutional sites such as the United Nations Cartographic Section or the <http://www.un.org/Depts/Cartographic/english/htmain.htm> or the NASA Worldwind website <http://worldwind.arc.nasa.gov>. Furthermore, Google Maps is connected to the official Google Blog and from there to many online technology magazines and other media websites. Here, a single service as Google Maps stimulates the emergence of an entire ecosystem of related and interconnected applications and services.

culture and knowledge, Rieder emphasizes the role of the user community in the creation, administration, and distribution of knowledge, and the shaping of cultural norms and values. The first three levels have been acknowledged as crucial for software development (e.g. Raymond 1998, Ciborra 2002; Von Hippel 1988, 2005), and companies increasingly focus on *user-centered design* (Norman 1988) in software development (e.g. 37Signals 2006).[339] But what is often underestimated is the dynamic that the extended branches of production can develop. Software alone is already complex, but the social dynamic is of an even greater complexity. Engaging in a large community which itself is not homogeneous but diverse and consisting of a multitude of individual members not committed to a corporate policy, the company is in need of many communication platforms to facilitate debate, to communicate its own policies, and to explain its own point of view on issues such as copyright, fair use, and the collaborative and unpaid labor of its extended developers. The *Google Public Policy Blog* something like a hallmark sign of a company acknowledging software development as being a socio-political matter and thus having understood the importance of communicating the company's policy. Comments posted by users are in fact often critical and offer dissenting points of view on the topics in question.[340] This example demonstrates in other words, that the logic of integration requires constant renegotiation and mediation between all participants involved. This also creates a socio-political level of interaction where all participants engage in decision-making processes and debates on, for instance, how to deal with new technologies and how to regulate them. Transparency and corporate responsibility thus appear to be crucial aspects

[339] The web application design company 37Signals promotes their approach to web design as a way of dealing better with the complexity of software by integrating the user into the production process. In addition to several web applications for project management and document-sharing, the company developed the open-source web application framework *Ruby on Rails*. Like many other web design companies, 37Signals' business model relies on collectively built and constantly improved resources that can be used by anyone, and on the creation of commercial applications. Their design approach is published as 37Signals: Getting Real, 2006, <http://gettingreal.37signals.com>.

[340] The Google Public Policy Blog is hosted at Google subsiadry Blogspot: <http://googlepublicpolicy.blogspot.com>.

for companies in order to interact with dynamic communities, to establish trust and, of even greater importance, a culture of governance relying on discussion and fair policies. As Rieder notes, Google tries to settle many aspects without recourse to legal means, by engaging in discussions and making a case for its own policies. In the case of Google Maps, this is a delicate undertaking, since the use of the database is regulated, and the satellite images are protected by copyright. Even if the collaboration processes of the Google API Group is reminiscent of open-source software development, Google Maps is for a large part not open source at all: the aerial photographies and the cartographic maps remain copyrighted property of Tele Atlas and NavTeq and are only licensed to Google. Further more Google decides to what extent the API will be adapted, and controls the server back-end, the code of which remains closed. Nevertheless, Rieder is right to argues for the participation of user communities, which have indeed emerged as crucial partners in producing Google Maps. The user communities benefit from a service providing data (e.g. geographical data), images (e.g. aerial photography) and an infrastructure, user communities could not create or offer. Google benefits largely well from these communities but is also responsible for meeting their expectations and measuring up to their cultural norms and values. With reference to Simondon, Rieder emphasizes that a "technical culture" can emerge in the interactions between the various participants (Simondon 1980). Like Ciborra, Rieder argues in favor of freedom of action and possibilities for appropriation as crucial premises for the synthesis of such a technical culture (Ciborra 2002, Rieder 2007).

Spreading music: Last.fm

While the dominant players of the music industry appear to be reactionary when it comes to the uncontrollable distribution of digitized music, other services start to integrate this practice into new applications and seek new ways of rewarding musicians. The online platform *Last.fm* presents many aspects of explicit and implicit participation. Musicians can upload their music and create individual artist's sites, similar to *MySpace*, but on Last.fm tagging facilitates connections between different genres and musicians, and it provides handy ways of navigating as well as exploring new music. Last.fm streams music from a licensed catalog of more than 65 million songs, and with 21 million monthly users it has emerged as a major music platform on the web.[341] The company generates undisclosed revenues from advertising and premium subscription fees, commissions from the sales of CDs, and tickets sold through their website.

Users can download the Last.fm player and listen in to streamed "radio stations" that can be personalized by users, or are generated from other users' playlists.[342] Employing user-generated tags for managing songs and genres, Last.fm seeks to deliver music according to search requests. More important is Last.fm's "audio-scrobbler" technology, which requires users to download a PlugIn for their media player. After the initial download, the audioscrobbler sends meta-information of any played song to the Last.fm database. The audioscrobbler automates tagging by adding the meta-information attached to mp3 files to a database for further information management. Implicitly, users participate in creating the Last.fm database

[341] 21 million users per month were reported for 2008, but Last.fm claims that the service is used by an estimated additional 19 million users listening in through third-party applications; see Jeremy Kiss: *Last.fm widgets boost user numbers*, in Guardian.co.uk, February 28 2008, <http://www.guardian.co.uk/media/2008/feb/28/web20.digitalmedia>.
and Dan Carlin: Last.fm, Mashing to the Music, in Business Week, November 13 2006, <http://www.businessweek.com/technology/content/nov2006/tc20061113_604776.htm>.

[342] By clicking a 'Love' or 'Ban' button in the Last.fm music player, users create individual profiles.

by streaming the meta-information about the songs they listen to automatically to Last.fm. This generates individual music profiles of users, and relates them to other listeners with similar tastes in music. Opportunities for social networking are provided through the weekly updated "neighbors" who share a similar taste in music, the possibility to look up users, and add them as "friends", and join "groups". If users add their geographical location, the service notifies them about concerts, festivals, and events featuring musicians that match those on the user's profile. Another crucial aspect are the data generated about which songs are played and how often. The audioscrobbler enables Last.fm to establish an exact count, while performance rights organizations can actually only give an estimate. Recently, Last.fm started a royalty program for artists who are not affiliated with a major label and therefore do not benefit from performance rights organizations' payments. To emerging and independent artists, the platform is attractive, probably not so much because of the potential royalty revenues, but rather as a vehicle for gaining popularity. The new songs of unknown artists are related through the tagging and audioscrobbling system to groups of a similar genre and are thus communicated to an audience of people who listen to similar bands.

Emerging artists can actively promote their music by searching for listeners of similar bands, which might be more popular and leave a message to refer users to their own artist's page on Last.fm. Possibilities for explicit participation in extending Last.fm are created through the application programming interface. Similar to Google Maps, Last.fm offers a wide range of possibilities, which cannot not be provided by the company alone, but which unleash their potential onto a dynamic community of developers. Through the API, the Last.fm database can be synchronized with all other applications providing an API.[343] Users employ the data streams

[343] The use of the Last.fm application programming interface is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike License, and limited to one request per second. For more information on the Last.fm API, available data are User Profile Data, Artist Data, Album Data, Track Data, Tag Data, Group Data, Forum Data, and Geo-aware Data, see <http://www.audioscrobbler.net/data/webservices>.
Last.fm subscriber Tomsky007 developed a scrobbler for Napster, streaming the meta-information to the user's Last.fm profile: <http://napscrob.sourceforge.net>.

for creating MashUp websites, but also develop completely new features, such as exporting the audioscrobbler technology onto mobile telephones.[344] They also develop programs that employ data from the Last.fm database, e.g. an application for developing desktop wallpapers according to personal music charts.[345] Users come up with many ideas for additional features that they think Last.fm should have, and post their suggestions and requests on the development forum at Last.fm.[346] User requests include the possibility to select Creative Commons licensed music only, a service that is used for photos in Flickr. It enables users to find music they can then use for remixes or other productions. Other user requests include a Last.fm player for game consoles, portable players, and the iPhone.

Like Google, Last.fm also thrives on the creativity of a dynamic and productive community, but it is also challenged by their ideas. This even goes as far as mashing the Last.fm API with their competitors *Pandora* or *Napster*.[347] While Google Maps shows a great deal of participation from users, Last.fm could provide a significant opportunity for the traditional music industry to participate in the digital age. Opening application programming interfaces literally unleashes an unimaginable and hardly controllable creativity. The rather hermetically closed music industry with its conservative stance towards digital distribution and the participation of communities can possibly find in Last.fm their connection to the digital age. And indeed, Warner Music and Sony BMG have licensed their catalogs to Last.fm.[348] However, Warner Music retracted its catalogue in June 2008, because the corpora-

[344] A list of Last.fm MashUps can be found at the Programmable Web, <http://www.programmableweb.com/api/last.fm/mashups>.
A mobile scrobbler, called mobbler, for Nokia smart phones has been developed by Last.fm subscriber Eartle, and can be found at: <http://code.google.com/p/mobbler>.

[345] A list of Last.fm tools can be found at: <http://lastfm.emoportal.de>.

[346] Development Discussion, <http://www.last.fm/forum/21716>.

[347] Pandora.fm uses the streaming service of online music provider Pandora but streams the metadata directly into the Last.fm user profile, <http://pandorafm.real-ity.com/login.php>.

[348] See blog entry of Last.fm co-founder and audioscrobble programmer Richard Jones: Free the Music, January 23rd 2008, <http://blog.last.fm/2008/01/23/free-the-music>.

tion expected Last.fm to introduce a fee-based subscription service for streaming music, a model Last.fm is not supporting aggressively, because those services have not been adopted substantially by consumers.[349] Media giant Bertelsmann seems also to have second thoughts about their chances to earn profits from selling music in the digital age. Their stake in Sony BMG has been sold in August 2008 to Sony.[350]

Similar to Google Maps, the Last.fm socio-technical ecosystem oscillates between copyrighted content and the free use of an information system. Last.fm mediates between major players from the music industry and a large number of users, who require additional value to just downloading music. This is also true for the Google subsidiary YouTube, which recently even engaged in active confrontation with the media corporation Viacom. YouTube, like Last.fm, provides environments and tools to perform new ways of listening to music or watching videos. This obviously raises the concern of those who control the traditional means of listening to music and watching television.

By opening their database, Last.fm turned into a socio-technical ecosystem of an information management system and their many users. Through widgets and third-party applications, such as streaming Last.fm to Facebook, it mashes with other socio-technical ecosystems. Last.fm is therefore much more than just the homonymous company. It is an ecosystem where the creativity of developing communities meets the intellectual property of the music industry, but where emerging and independent artist can also promote their music, where event organizers can advertise, and retailers can sell their products, and it furthermore serves as a "third place" where users can meet. Moreover, Last.fm is not limited to the Last.fm website, but spreads out through the application programming interface to any other platform. Participation in Last.fm therefore reflects an integrated collaborative

[349] Saul Hansel: Warner Music ends at Last.fm, New York Times, June 6 2008, <http://bits.blogs.nytimes.com/2008/06/06/the-warner-music-ends-at-lastfm>

[350] Eliot van Buskirk: Sony buys Bertelsmann's Sony BMG stake for $ 1.2 billion, Wired, August 5 2008, <http://blog.wired.com/music/2008/08/bertelsmann-bai.html>.

effort, which is only concerted to a certain degree and more often than not appears unorganized, with regard to its users as well as with regard to its licensing partners from the industry.

Creating knowledge: Wikipedia

The online encyclopedia Wikipedia has drawn attention to the explicit participation of a multitude of users creating or contributing to articles. Founded on principles of free access to information by new economy entrepreneur Jimmy Wales, it provides an easily accessible interface enabling lay users to add or change any article (Benkler 2006:70-71).[351] This approach raised questions concerning authorship, quality control, the fact that lay users were replacing experts, and the danger of possible misinformation.[352] Comparing Wikipedia with established encyclopedias, such as the *Encyclopedia Britannica*, triggered arguments from both critics and promoters. Most notable and amply quoted is the 2005 survey in *Nature* on the accuracy of scientific entries in both encyclopedias.[353] The heated debate about Wikipedia demonstrates how public perception of knowledge is changing. This transformation raises utopian expectations as well as dystopian fears. However, comparing Wikipedia to the Encyclopedia Britannica makes little sense since both are completely different formats which are in fact impossible to compare. Wikipedia is primarily a technical platform and infrastructure facilitated by the wiki software Wikimedia and maintained by the Wikimedia Foundation. The interface design of

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[351] See Jimmy Wales' entry: Free the Encyclopedia, on Lawrence Lessig's weblog, Lessig.org, August 7 2005, <http://lessig.org/blog/2005/08/free_the_encyclopedia.html>.

[352] A prominent critic is former Encyclopedia Britannica editor-in-chief, Robert McHenry, who described Wikipedia as a "faith based" encyclopedia, criticizing the policy with regard to correcting mistakes and the lack of guarantees for facts and truth, see McHenry, Robert: *The Faith-based Encyclopedia*, in TCS Daily, November 15 2004, <http://www.tcsdaily.com/article.aspx?id=111504A>. A popular account of the debate on the question of truth and Wikipedia can be found in the documentary The Truth according to Wikipedia, VPRO, April 7 2008, <http://www.youtube.com/watch?v=WMSinyx_Ab0>.

[353] Jim Giles. 2005. *Internet encyclopedias go head to head*, Nature, Vol. 438, No. 7070.

this software and the quality of a wiki as an editable web page enable the thousands of users to participate actively in the creation of a wide variety of encyclopedias and other media formats.[354] The different languages Wikipedia appears in do not simply feature translations of articles from one language to another, but differ in their cultural and regional nuances. Wikipedia therefore is by definition more than just an encyclopedia; it is a socio-technical ecosystem, nourished by utopian ideology as fertilizer. The barrier of participation in Wikipedia is deliberately low. Users do not necessarily have to register in order to participate, which allows less interested users to just participate in correcting spelling mistakes in articles, or quickly start editing or adding one. These anonymous "good Samaritans" contribute significantly to the quality and scope of Wikipedia, while the registered users maintain and improve the overall resource (Anthony, Smith, Williamson 2007). However, the low barrier of participation also attracted vandals, spammers, and frauds. In that respect, the Wikipedia project faces even greater challenges than Google Maps or Last.fm. Wikipedia usually deals confronted with an anonymous group of participants, and relies on a software design that is easy to employ, even for lay users without any specialized computer skills. With the increasing visibility and the pervasive use of Wikipedia in many countries, the encyclopedia has become the target for socio-political debates and a 'battlefield for truth'. Articles about politicians have been sugar-coated by their supporters and distorted by opponents, articles about controversial persons or controversial topics are subject to so-called edit wars.[355] Just as the quality of articles on Wikipedia is

[354] Wikipedia appears in 264 different languages (as of July 2008), all of them constituting an independent encyclopedia featuring different articles on the same topic in the different languages; they also differ significantly in scope and number. Other media formats on the infrastructure of the Wikimedia Foundation are among others, Wikiquote, a collection of quotations, Wiktionary, an online dictionary, Wikibooks, a collection of public domain learning materials, and Wikisource, a platform for translating public domain texts. See Wikimedia Foubndation: <http://wikimediafoundation.org/wiki/Our_projects>.

[355] In January 2006, Wikipedia noticed changes made by members of the US Congress to articles on politicians, see: Matthew Davis: *Congress 'made Wikipedia changes'*, BBC News, February 6 2006, <http://news.bbc.co.uk/2/hi/technology/4695376.stm>.
An edit war describes the conflict between different editing parties over the content of an article. Frequently subject to edit wars are controversial topics and persons, such as the Yugoslavian Civil

assured through the process of reviewing and using them, the adaptation of the social and technological structure of Wikipedia by its users is in flux and constantly in the making. All kinds of users are involved in the creation of Wikipedia, and unlike tweaking the Google Maps API or the Last.fm API, changing a Wikipedia article does not need any skills at all, which expands the group of potential users significantly. They all create Wikipedia, no matter what their motivation or the quality of their contribution. *Scientology* removes critical references from articles, as does *Dow Chemicals*, by deleting references to the disaster in Bhopal, and their involvement with *Agent Orange* and silicone breast implants. The *FBI* deleted aerial photographs from an article on Guantanamo, and members of the US Republican Party changed the wording from "occupying" to "liberating" in an article on Iraq. A user from the Turkish treasury deleted an article on the Armenian Genocide, and the company *Diebold,* manufacturer of voting machines that have played an infamous role in recent American elections, removes any critical or controversial references from the Diebold entry.[356] Aside from the participation at the level of creating or changing Wikipedia articles, users participate in maintaining, and often guarding articles, creating policies for article writing, and social interaction on Wikipedia as well as creating tools to improve and promote these policies.[357] Researchers at IBM and MIT developed software that allows to retrace the evolution of individual Wikipedia articles and visualizes the number of changes and the users

War, the Armenian Genocide, George W. Bush, Open Source etc. But also many companies and PR firms attempt to manipulate Wikipedia articles.

[356] All examples are taken from the Wikidgame website hosted by Wired magazine and collect the '*most shameful Wikipedia spin jobs*', <http://wired.reddit.com/wikidgame/?s=top>. See also Kevin Poulsen: *Vote on the most shameful Wikipedia Spin Jobs*, Wired Blog, August 13 2007, <http://blog.wired.com/27bstroke6/2007/08/vote-on-the-top.html>.

[357] Policies for writing articles in Wikipedia include the *Neutral Point of View* (NOPV) that requires each article to be written without bias and with a balanced presentation of controversies, see the official Wikipedia Neutral Point of View Policy, <http://en.wikipedia.org/wiki/Wikipedia:Neutral_point_of_view>
See also Wikipedia, List of policies, <http://en.wikipedia.org/wiki/Wikipedia:List_of_policies>, and Wikipedia, List of guidelines, <http://en.wikipedia.org/wiki/Wikipedia:List_of_guidelines >

involved (Viégas; Wattenberg; Dave 2004).[358] Caltec student Virgil Griffith developed the *WikiScanner*, a tool that traces the IP addresses of users and links them to the owners of related blocks of IP addresses. WikiScanner relates these data to changes made in Wikipedia anonymously, registered in the history only with an IP address, and thus reveals the organizations and institutions from where users accessed and changed Wikipedia entries.[359] The Wikipedia community and the Wikimedia foundation engage in social processes of quality control and improvement. Disputes on editing and etiquette are delegated either to discussions linked directly to the article in question or to Requests for Comments, where on an informal platform a commentary is requested from a third party. In response to the violations of Wikipedia policies by members of the US Congress, for instance, a request for comments was initiated to collect responses from the community. It presented evidence of the violation of Wikipedia's policies and etiquette and advocated the ban of related IP addresses from being able to edit Wikipedia entries.[360] The media's response to the ban of US Congress IP addresses from editing on Wikipedia, as well as the allegations that articles on the free, accessible online encyclopedia were distorted and vandalized, exposed the cheaters in an embarrassing way. The WikiScanner is a handy tool to enforce Wikipedia policies and reveal potential motivations for changes made to entries. The social control performed through moderators, who can temporarily close articles for further editing in order to avoid editing wars, or the request for deleting an article that doesn't meet the quality standards or policies defined by Wikipedia, increase the pressure on editors to contribute quality entries and make it easier to bar vandals. A number of other techniques increase reliability and quality, such as labeling an

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[358] *History Flow* can be found at: <http://www.research.ibm.com/visual/projects/history_flow>.

[359] The WikiScanner can be found at: http://wikiscanner.virgil.gr/
See also John Borland: *See, who is editing*, in Wired Magazine, August 14 2007, <http://www.wired.com/politics/onlinerights/news/2007/08/wiki_tracker>.

[360] Wikipedia, Request for comments/United States Congress, <http://en.wikipedia.org/wiki/Wikipedia:Requests_for_comment/United_States_Congress>.

article as incomplete, as excellent or as supposedly biased. On the level of software design, many features were integrated in the Wikimedia-software to enforce the Wikipedia policies.[361] A dynamic practice therefore developed over the years, involving the most different parts of society, who either engaged in the debate over knowledge production, actively contributed to the creation of a growing resource, developed tools for expanding it or even found ways to commercially exploit it.[362]

Wikipedia demonstrates how the most divergent parts of society can be involved in a large project that is causing controversy, but also generating meaning and constituting a powerful, extensively used cultural resource. Like Google Maps and Last.fm, it demonstrates a practice of debate and discussion rather than legal confrontations. As opposed to the logic of c*onfrontation*, approaches of i*ntegration* demonstrate the basic affordances of digital technology and take their social use into account when discussing socio-political integration into society. While many examples of implementation thrive on the unacknowledged participation of users, integration exceeds by far an understanding of users as "handy helping hands", often dubbed *crowdsourcing*. Rather, it requires a radical rethinking of corporate policies, and even more importantly, a society-wide debate on copyright, patents, and the common use of cultural resources. A culture characterized by the dynamics of *integration* thrives on the free accessibility and the free use of collectively created resources, and could effectively enable a mode of participation that transforms the user's knowledge of technology into a civilization of participatory technology.

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361 The changelog of the MediaWiki software versions, as displayed in the related Wikipedia article, shows that in the course of time features have been integrated that allow easy recovering of deleted articles, user tracking, user banning, article protection, etc. have been integrated. See, release history of the MediaWiki software, Wikipedia.org/MediaWiki, <http://en.wikipedia.org/wiki/Mediawiki#Release_history>

362 The search engine Powerset seeks to address requests formulated in natural language, and uses Wikipedia to retrieve answers. This is possible because Wikipedia's content is accessible and, more importantly, can be read by machines Powerset, <http://www.powerset.com>.
The German publisher Directmedia issued a DVD with selected articles from the German Wikipedia, as well as a book on the evolution of Wikipedia.

In Chapter 5, the socio-political dynamic resulting from user appropriation was analyzed. A conservative reaction to user appropriation has been seen in the dynamic of *confrontation*, while *implementation* seeks to employ user activities. The dynamic of implementing user activities, in particular, demonstrated that the enthusiastically embraced user participation has a dark side raising questions concerning the exploitation of volunteer labor, control, and censorship. An integration of user activities and corporate objectives leads to a balancing governance of business interests and user activities. It includes acceptance for the recently developed custom of collective work processes and the perception of commonly used resources, and stimulates processes of transparent decision-making, the publication of technological settings, and an attitude of mutual respect for the various participants.

Conclusion:
Challenges for a participatory culture

Understanding Participation

In many aspects, the participatory culture constitutes new formations of cultural production. The intertwined dynamics of design and appropriation in the cultural industries are one of it. The present research has argued that the emerging media practice and the discourse on information technologies harbor a promise for social progress. In fact, the affordances to fulfill such a promise can be inscribed into technological design, which, in return can also stimulate appropriation. While traditional distinctions such as of user-producer and audience-sender begin to get blurry, the increasing participation of users in the production of media texts and the appropriation of consumer goods and technology need to be analyzed in a way that differentiates the various ways in which the so-called participatory culture takes shape. And while diffusion of information technology in general, and the personal computer, software, and the Internet in particular, have resulted in the far-reaching availability of technological knowledge in society, the implications of technological choices for the functioning of participation are hardly brought to the fore in discourses on participatory culture.

This research has analyzed participatory culture as a dispositif. It analyzed our perception of the unfolding media practice as constituted of discourses imagining or claiming participation, as well as the technologies and their specific qualities, and furthermore people, companies and organizations in various roles. Tracing the various constituents of this dispositif, reveals dynamic actor-networks transforming the meaning of technologies, affecting discourses, and shaping media practice. Furthermore, laying bare these actor-networks

through the various cases studies resulted in suggesting the need for a shift in understanding participatory culture. The user can no longer be presented simply as a consumer that has turned into producer, but needs to be analyzed by taking into account the actual social context and its relation to the overarching production apparatus with its power relations, legal administration and socio-political framing, as well as to an underlying structure of assemblages of various corporate interests, software design, and social relations among the actors involved, which are difficult to bring to the surface. In analyzing the so-called Web 2.0 applications, this study has tried to make visible the emerging socio-technical ecosystems, that can consist of numerous different actor-networks, but also be part of an actor-network itself. Those constellations of large numbers of users and opaque technologies can be better approached when they are conceived of as environments consisting of unknown variables and complex and dynamic interactions. They constitute an emergence of complexity in different aspects: interaction between users can already be established below the threshold of the formation of a community, or even reciprocal communication. Although communities can be, and often are part of socio-technical ecosystems, the community as a driving force for social interaction and production of, for instance, user generated content is not preconditioned. Furthermore the individual contribution does not matter much in socio-technical ecosystems, but the sheer quantity of contributions provided by a large number of users most certainly. Socio-technical ecosystems present therefore a different quality of participatory culture. They show that software design can automatize interaction and production and also channel user activities. Even though they do indeed facilitate user participation, this happens in a different way than proponents of the romanticized ideal of community-based participation could imagine.

Participatory culture therefore has to be understood as an extension of the culture industry into the realm of users. In contrast to the romanticized narratives spread in popular discourses, the participatory culture is very heterogeneous and characterized by a plurality of different configurations that are affected by many, often contradictory interests. It is also not helpful to glorify the Davids battling the industrial Goliaths, or to hastily embrace a pseudo-participation of users on corporate Web 2.0 platforms. Despite the many examples for active user participation in design processes, the MySpace, YouTube, Facebook, Twitter, and other Web 2.0 applications rather bear witness to the emergence of a new form of media consumption and the constitution of audiences, as well as the rise of powerful corporations shaping and controlling cultural production and its preconditions.

The main forms of digital technologies—computer, software and the Internet—have lead to the emergence of widespread technological knowledge and competences, as well as the availability of resources and various communities to develop and master this knowledge. What has been termed participatory culture, however is mainly characterized by emerging new media corporations which conceived ways to provide platforms for user activities embedded in new business models. In addition, there also is the emergence of a socio-political concern for user activities, and the attempts to constitute a collectively shared understanding of the new technologies. This transformation from knowledge about technology to a socio-political regulation of technologies and their related practice is visible in the dynamics that have been described in this research as strategies of, respectively, confrontation, implementation and integration.

On the fringes of the cultural industries, users are taking the initiative and create specific practices of media use. While these practices stand in stark contrast to established business models, modes of perception, and traditions,

they simultaneously create the conditions for innovative business opportunities, open new perspectives, and shape new habits. In this very process, users recognize the need for social acceptance and legal protection, the objective being to encourage new forms of social action and interaction through legal means. It has been argued that the blurring of the users and producers leads to a new alignment of consumers and citizens (Uricchio 2004). But where is this going? Was the empowerment of the Internet Generation just another empty promise, or will the revolution spread through the BitTorrent networks as decisive instruments in the digital class struggle? Probably neither one of these scenarios but what is unfolding in response to user participation, is a socio-political process by means of mediating technology.

Shaping Society

As this research has demonstrated, users allocate, develop, and spread their knowledge of technology. With reference to Michel de Certeau one could describe both the user activities of appropriation and the companies' (re)actions at the level of technology design as tactics and strategies (Certeau 2003). And not only technology and media practice can be seen as potential strategies and tactics, but also the ways in which laws, bureaucratic administration and policies are employed. Some configurations appear to be very efficient in raising attention (e.g. grassroots journalism, netactivism, viral marketing, SPAM, etc.), promoting a specific use of technology (e.g. open source software, P2P, voice over IP, etc.), or in developing new business models (e.g. one-click-hosting, online advertising, Internet telephony, user-generated-content, etc.). Legal conflicts are the effect of controversial practices such as unauthorized file downloads, and socio-political debates are unfolding in view of attempts to regulate those and other practices. They develop in society wide debates, affecting decision-making processes and legal solutions. In 2005 software

patents were on the agenda of the European Parliament, which rejected an earlier directive of the European Council of Ministers on copyrights and software patents. In 2008 the International Organization of Standardization (ISO) caused disturbance among their members because Microsoft obviously compromised the process in order to have their format Open XML accepted as international standard. Recently the Anti Counterfeiting Trade Agreement (ACTA) raises the concern of various actors, including companies which are afraid that too tight a regulation of intellectual resources might stifle innovation. Organizations concerned with issues of privacy and citizens' rights object to the measures that are proposed to enforce copyright laws, and criticize that the companies and lobbyists pushing the trade agreement are not publicly known, and that the entire process is rather undemocratically executed.[363] These examples show how media practice is accompanied by an increasing concern for public policies and questions of governance. They also demonstrate a public interest in questions of technology regulation, and the definition of technological leitmotifs.

Organizations, such as the Electronic Frontier Foundation (EEF), the Internet Society (ISOC), the Foundation for a Free Information Infrastructure (FFII) represent on a wide and international level the civil society's interest in co-shaping the legal integration of information technology and its use into society. The World Summit on the Information Society (WSIS) is a platform for the process of global implementation of information technologies, its use and legal regulation on the national and the international level. Those platforms and countless other, citizen initiatives, activist groups, corporate lobby groups, and public administration institutions are part of a transformation process that eventually will further constitute the information society. What appears on the

[363] Proposed US ACTA multi-lateral intellectual property trade agreement (2007), WikiLeaks, May 21 2008, <http://www.wikileaks.org/wiki/Proposed_US_ACTA_multi-lateral_intellectual_property_trade_agreement_(2007)>

macro level—presented in Chapter 4 as the emergence of a new media practice with regard to the development and diffusion of technological knowledge—is transformed into a socio-political debate and law proposals on a society-wide level (e.g. Lessig 2000, 2006; Biegel 2003). The challenge is to question to what extent a participatory democracy (Bachrach 1967; Pateman 1970) will enable the people, who are actually using these technologies, to actively take part in this transformation process and affect the decision making processes that will eventually result in laws. But as yet we understand little of the dynamic and complex interactions unfolding between the many actors in the extended culture industry, not to mention ways how this practice could be connected with formalized processes of democratic decision making.[364]

There clearly is a participatory aspect in the way users seek to transform their knowledge of technology into culturally accepted norms and habits. Extending participation from tinkering with products to socio-political actions is important in view of the challenges facing the emerging information society: copyright enforcement, software patents, surveillance technologies, data retention, privacy, as well as network neutrality are but a few of the urgent issues whose regulation will affect use and development of information technologies substantially. The ongoing attempts by the copyright industries, in concert with the aim of politicians to control access to information and citizens' communication, seriously threatens the recently developed media practices (Lessig 2001, 2004; Vaidhanathan 2001). An increasing interest of politicians in surveillance technologies, and the ever-growing need of copyright industries to lock down

[364] Noteworthy is the experiment the city of Vienna launched to distribute funding for new media artists: Instead of assigning funding to individual applicants in a top-down process monitored by the bureaucrats, the total subsidies are given to the city's community of media artists, the so-called *NetzNetz* community. In a complex voting system the community is distributing the funding to projects and individual artists. Although this process has been very controversial, and has been severely (mostly by those who benefited best under the top-down model of distribution) it has lead to a dynamic and thriving art scene, organizing an annual convention to present their work, and establishing an international community of artists in residence.
NetNetz, <http://netznetz.net>.

cultural resources and technologies, could lead to a regulation of Internet technologies and computer use that would immediately abolish user anonymity, free information, and access to resources (Walker 2003). By requesting civil enforcement of copyrights, these corporations ultimately constitute a serious danger to civil rights. Most recently, Jonathan Zittrain launched an urgent call for change, to escape from the anticipated restrictions on technology and freedom (2008). These voices are not necessarily a dystopian backlash to the formulated utopia of participation, but again show the social scope of technology use. All this constitutes a reconfiguration of established business models, modes of production, and power structures. As Mattelart has warned, the debates on media practice are not settled yet, and more than a decade after the World Wide Web became a massively used application, users' freedom to communicate is by no means guaranteed (2007). It is therefore necessary to take a step beyond an understanding of participatory culture as merely appropriating consumer goods. The process has continued on three levels: a) in scholarly discourse, b) in the designer's discourse, and c) in the civil constitution of policies.

Scholars must not confine their work to a discourse justifying technological advancement, or even worse to being an appendix to marketing activities. The scholarly discourse consequently has to revisit its affection for active users, and to analyze user activities with regard to the actual socio-political implications they may have for a reconfiguration of power structures. Analyzing the actor-networks involved in shaping our cultural reality through patent laws, regulations, technological design, they can contribute significantly to making socio-political dynamics public and comprehensible to a broader audience.

An interdisciplinary effort is necessary to bridge the divide between cultural analysis and technical design. Participants from both domains need to develop a shared understanding of technology and socio-political implications. Both sides need to develop a certain form of sensibility: scholars need to comprehend, as students of

culture, to what extent design solutions are related to materials, tools, and prior definitions of objectives, while designers can develop a sensibility for the discursive aspects of technology. In some developing communities this is already the practice. The open-source community explicitly discusses socio-political aspects of design. Wikipedia and Google Maps are two other examples of technological design and knowledge creation accompanied by a discourse and decision-making processes that resemble a democratic approach to cultural practice and design, founded on constitutional guidelines. Already a lively discussion is taking place in the domain of open source, as well as in the many grassroots movements for free information, citizen journalism, and the free culture movement, aiming to amend copyright laws. The process of advocating the emerging media practice has already resulted in many requests for constituents of an effective participation in the information society, such as transparency of technologies, free access to information infrastructures, a neutral regulation of web traffic, and the right for private and anonymous communication. Furthermore, policies can formulate a technological leitmotif embracing the innovative value of shared resources.

We must not sit on our hands while cultural resources are exploited and chances for enhancing education and civil liberties are at stake. The humanities must not blindly justify technological development (nor adopt the conservative stance of the techno-pessimistic *Kulturkritik*) but must become critically involved in the debate and provide the necessary insight and analysis for reflection and decision-making. Instead of letting the humanities become a mere appendix of marketing departments, critical theory has to participate in the process of policy-making. Its aim should be to unveil hidden networks, to "make things public" and map assemblages, detect alliances to provide arguments in the ongoing and forthcoming debates on our cultural values, our freedom and our civil rights (Latour 2005a). The current debates on copyright, software patents, privacy, and net neutrality are actually affecting questions of principle. More

important than the temporary increase in revenues is the freedom of our civil society and our cultural values. The media practice that emerged in the past two decades consists of many aspects that improve and promote our society. It would be grossly negligent to risk these values by aligning the cultural practice to dubious business objectives and populist politics.

Resources

Background Interviews and e-mail exchange with:

Aibopet (Aibohack), Hans Bernhard (ubermorgen.com), Canphaz, Florian Cramer, Andreas Leo Findeisen (TransformingFreedom.org), Hamtitampti (SmartXX), Edgar Hucek (Xbox-Linux), Dr. Helmut Kolba (Sony Austria), Christian Kausch (Broque), Franz Lehner (Xbox-Linux), Sebastian Lütgert (Pirate Cinema), Moritz "mo" Sauer (Netlabel Catalogue, Phlow.de), Rnd0m; Denis Jaromil Rojo (Rastasoft), Audrey Samson (Genderchangers), Michael Steil (Xbox-Linux), Thomas Thurner (Team Teichenberg), Xwarrior.

As well as:

Findeisen, Andreas Leo. 2005. Interviews with the Plone Community at Plone Conference 2005, *Semper DVD 1.0* edited by Leo Andreas Findeisen, unpublished.

Findeisen, Andreas Leo. 2005. Interviews with the NetzNetz Community, Mana Sprint 2005. Unpublished.

Websites, forums, weblogs

Aibohack <www.aibohack.com>
AIBO-Life <www.aibo-life.org>
Aibosite <http://bbs.aibosite.com>
Alexa, Web traffic statistics, <www.alexa.com>
Fibreculture <http://www.fibreculture.org/>
First Monday <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/>
Heise.de <www.heise.de>
Internet Archive, <www.archive.org>

Internet Spec List, <www.graphcomp.com/info/specs>

Nintendo DS-Scene <www.ds-scene.net>

NDSS.NL <www.ndss.nl>

Requests for Comments, <www.ietf.org/rfc.html>

Slashdot <www.slashdot.org>

Sourceforge <www.sourceforge.net>

Touchgraph Google Browser, <www.touchgraph.com>

Transforming Freedom, <www.transformingfreedom.org>

Wikipedia, <www.wikipedia.org>

Xbox-Scene <www.xbox-scene.com>

YouTube, <www.youtube.com>

Mailing lists

AIR-L, Association of Internet Researchers, <http://aoir.org>

iDC List, Institute for Distributive Creativity, <http://distributedcreativity.org/>

my-ci, creative industries research network, <http://idash.org/mailman/listinfo/ci-l>.

MTS in Web 2.0

Flickr: http://www.flickr.com/photos/gastev/

Last.FM: http://www.last.fm/user/gastev/

Delicious: http://del.icio.us/Gastev

Facebook: http://www.facebook.com/profile.php?id=585259301

Plazes: http://plazes.com/users/17074

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Appendix A, Abbreviations

AJAX	Asynchronous Javascript And XML
API	Application Programming Interface
CPU	Central Processing Unit
DMCA	Digital Millennium Copyright Act
DIY	Do It Yourself
DRM	Digital Right Management
EFF	Electronic Frontier Foundation
EULA	End User License Agreement
EFIX	Exchangeable Image File
FAQ	Frequently Asked Questions
FLOSS	Free/Libre Open Source Software
FTP	File Transport Protocol
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
IRC	Internet Relay Chat
P2	Playstation 2
P3	Playstation 3
P2P	Peer To Peer
PSP	Playstation Portable
RFC	Request For Comments
SDK	Software Development Kit
SMTP	Simple Mail Transfer Protocol
SNS	Social Networking Site (SNS)
UGC	User Generated Content
WLAN	Wireless Local Area Network
XDK	Xbox Development Kit

Appendix B, Glossary

AIBO (Artificial Intelligence roBOt), a robotic toy dog with limited learning capabilities developed by Sony from 1999 to 2006.

API (Application Programming Interface)

AiboSite, an AIBO user community forum.

Bastard Pop, also called Mash Up Music, Bootlegs, Bootys,or Blends, a practice of mixing or meshing different pop songs.

BitTorrent, a P2P file sharing protocol.

Blogosphere, describes the plurality of weblogs often commenting on current politics, popular media and actual events. The blogosphere has been with reference to Habermas recognized as a public sphere. It is in fact the equalizing of the editorial common to established media.

Case Modding, describes the appropriation of the case of an electronic consumer good, most often a Personal Computer, a cell phone or the case of a computer game console.

Del.icio.us, a Web 2.0 service to index and share bookmarks of websites.

Dreamcast, a game console introduced by SEGA in 1998 and due to market failure discontinued in 2001. An active community kept developing applications for the Dreamcast. In 2006 the console was relaunched. (main forum: <www.-dreamcast-scene.com>

Digital Right Management (DRM), technologies to enforce and facilitate the use of copyrighted content. DRM systems often come bundled with digital commodities, such as movies, music, games or electronic books.

Electronic Frontier Foundation, EFF, a non-profit advocacy group engaging in preserving civil rights. The EFF is known for their criticism of the DMCA, software patents and DRM.

Fan Culture, a term widely used to describe activities of fans and fan communities. Henry Jenkins employed the term for describing media productions by fans.

Friend Tech, a Taiwan based CPU upgrading company. It became recognized for its modification of the Microsoft Xbox as DreamX <www.friendtech.com>.

Flickr, a popular photo sharing and hosting website, and subsidiary of Yahoo.

Hacker, initially the term for a person with remarkable interest in problem solving, most often related to technology. Hacker became synonymous for cracker, which is someone who does actually the same, but in bad faith.

Hack, with reference to the original understanding of hacker, a creative solution to any technical problem.

Hardmodding, **hardmod**, term used to describe a modification of an electronic consumer device through manipulating the hardware and replacing the original processor thorugh a modchip. Different from softmod.

Homebrew Software, describes software produced outside official production channels, often produced within communities for proprietary devices, such as the Xbox, Playstation Portable, Nintendo DS, etc. For many electronic consumer goods homebrew software is developed.

Honeypot, a server—operated by contractors of movie and music industry associations —for file sharing, but actually aimed at attracting users who are then persecuted for committing copyright infringement. It appears that the organizations providing these honeypots, often violate existing laws themselves.

Internet Relay Chat (IRC), an Internet application for real-time chat communication, either as one-to-one or as group communication.

Lik Sang, an Hong Kong based company for modchips and accessories for gaming devices, operated by Austrian citizen Alex Kampl. It was confronted with a series of law suits due to selling modchips, and modded game consoles and had eventually to cease business in 2006. <http://liksang.com>.

MechInstaller, a software using an exploit of the game *MechAssault* (Microsoft Game Studios 2002). Using Mechinstaller users could softmod their Xbox.

Metadata, or **meta-information**: information about Information. The bibliographical Information of a book can bee seen as meta-information. In the Web 2.0 metadata are organized in → *tags*, which are machine readable data added to a certain file, describing the contents of the file.

Modchip, an electronic device for disabling built in limitations in electronic consumer goods such as game consoles. The need for circumventing vendor's limitations lead to the emergence of a grey market. Their legal status is ambiguous;in the United States modchips are prohibited due to the DMCA.

Mod, a modification of a game. The popular first person shooter Counterstrike is a mod of the commercial game Half Life.

Mozilla, is the name of a foundation for the open source development of the open source Mozilla web browser, known as Firefox, and the e-mail client Thunderbird.

Napster, the first peer-to-peer application for sharing files, developed by university student Shawn Fanning in 1999. In 2001 Napster was shut down because of copyright infringement.

News groups, refers to Usenet mailing list accounts. News groups are discussions that can be organized and accessed through e-mail clients.

Open source software, describes a practice in software development and distribution to provide the application together with the source code, which then can be reviewd and modified by other programmers.

Overclocking, describes manipulating the central processing unit of a computer or a game console for faster performance.

Participation, a term coined to describe the increasing productivity of consumers in weblogs, product modifications, and media productions.

Patch, a software module to change, improve or revert functions of a software program.

Peer-to-Peer, describes ad hoc computer networks for file exchange. Peer-to-peer technologies are often used for so called file sharing. It is in fact a handy method for informations retrieval and distribution.

Pirate Bay, a website providing indexing and searching of BitTorrent files.

Playstation 2, is Sony's very successful game console released in 2000 and sold over 120 million units world wide.

Playstation 3, is the successor of the Playstation 2. It consists of sophisticated hardware and as opposed to other game consoles it partially open source and runs a pre-installed Linux distribution.

Playstation Portable, a hand held game console, famous for its large screen. The PSP was hacked within 24 hours after release and developed a large homebrew scene.

Produsage, a term coined by Axel Bruns to describe a blurring of the producer user distinction in cultural production on the World Wide Web and in digital media in general.

Prosumer, a term coined by Alvin Toffler.

Reverse Engineering, revealing technological design through step by step analysis of all components and principles.

Silent Modding,

SmartXX, a team of modchip producers.

Software Development Kit (SDK), a collection of tools (either hardware or software or both) for software developers to develop applications for a certain device. Microsoft would equip third party producers with a SDK for the Xbox.

Softmodding, softmod, describes the modification of an electronic consumer

device through a software application, often through exploiting security gaps in the design of the operating system or the executed software. When using a softmod vendor limitations can be circumvented without using a modhcip.

Sourceforge.net, an online platform and repository for software developers to organize their work and communicate with their fellow colleagues, to present their project to users and to host the software for downloads. As of November 2007 Sourceforge counted 162,687 projects and 1,730,642 registered users, and in July 2008 182,849 registered projects and 1,902,805 registered users <www.sourceforge.net>.

Slashdot, an important online platform for commenting on technology news and related socio-political aspects. <www.slashdot.org>.

Tags, or meta tags are freely chosen keywords assigned by users to different objects stored online. Tags are used to improve information retrieval, and navigation on websites.

User, initially to describe the computer user, but used here to describe any user of software and computer technology. Companies and producers are as much users as the consumers of their productions. Users have to be differentiated according their involvement in power structures, technological skills, invested time etc.

Warchalking, describes attaching graphical symbols in public space to sign accessible wireless networks. The icons were designed by Matt Jones in 2002. Despite the fact that the symbols cannot be seen frequently Warchalking received a considerably high media attention.

Wardriving, searching for open wireless networks by driving through an area.

Weblog, initially a website on which a user would report (log) websites she encountered surfing. Weblog describes a website with a user interface for content management and a comment function for readers. Due to the easy to use interface these website systems became extremely popular as weblogs.

Wiki, the term originates from Hawaiian for fast and describes on the Web a system of HTML documents that can be easily edited by any user. The most famous example for a wiki is Wikipedia.

WLAN, a Wireless Local Area Network refers to a wireless connected computer network.

Xbins, is the name of a ftp server hosting the largest collection of homebrew software for the Microsoft Xbox. For retrieving file from Xbins users are required to request a one-time user name and pass word through the Internet Relay Chat. The software collection can be browsed via the website <www.xbins.org>.

Xbox, the first Microsoft game console released in 2001. It consists for large parts of common personal computer components, but was limited to the functionality of a video game console. Despite the limitations the console was hacked fast and a dynamic homebrew scene emerged.

Xbox 360, succeeding the Xbox in 2005 with considerable design changes, implementing many aspects developed in the homebrew scene and integrating the possibility for third party software development through an Integrated Development Kit aiming at game developers and homebrew scene.

Xbox Linux Project, a hacker project aiming at porting Linux on the Xbox. The project effectively provided the possibility to execute Linux without using a modchip.

Xbox Media Center (XBMC), the most successful homebrew application for the Xbox, turning the console into a media center for playing music, movies, DVDs and storing collections of media files. It even made the remote control dispensable that Microsoft required to purchase in case of using the DVD function. The XBMC was awarded the Sourceforge award for Best Multimedia and Best Game Project in 2006 <www.xboxmediacenter.com>.

Xbox Scene, a major online platform for Xbox users <www.xbox-scene.com>.

Xbox Development Kit (XDK), a device for developing licensed software (e.g. games) for the Xbox. Intentionally aimed at official third party developers, the XDK 'leaked' and attracted many a dynamic scene to develop software that, however, was unlicensed, and is labeled → homebrew software

XNA, (XNA is not Acronymed), a software development kit integrated into the retail version of the Xbox 360.

Yahoo Pipes, a MashUp editor, a Graphical User Interface for connecting different APIs together and create a data stream.

Zusammenfassung

User-Partizipation und die Ausweitung der Kulturindustrie

Computer und Internet haben sich in den vergangenen 20 Jahren als weit verbreitete Medien im Alltag etabliert und neue Formen kultureller Produktion und sozialer Interaktion hervorgebracht. Die Einführung der neuen Technologien wurde von einem populären Diskurs begleitet, der sozialen Fortschritt durch technologische Entwicklung versprach. Der Computer und vor allem das Internet wurden als Medien der bürgerlichen Aufklärung und Emanzipation präsentiert. Sie sollten nicht nur geographische Distanz, sondern auch soziale Unterschiede überbrücken.
Tatsächlich ermöglichten die neuen Technologien die Teilnahme von einfachen Usern/Amateuren an der kulturellen Produktion. Amateurkultur war bereits vor dem digitalen Zeitalter fester Bestandteil der Kulturindustrie, hatte nun aber neue technische Möglichkeiten der Produktion und konnte über die globalen Informationsnetzwerke verbreitet werden. Dies wurde als Erfüllung des Partizipationsanspruches der Konsumenten gewertet und als *Participatory Culture* beschrieben.

Die vorliegende Arbeit analysiert die Partizipation der User im Kontext eines Dispositivs aus populärem und wissenschaftlichem Diskurs, des technologischen Designs und seiner Appropriation. Dabei wird weniger eine Umkehrung der Produktionsverhältnisse von den etablierten Kulturproduzenten zu den Usern festgestellt, als eine Ausweitung der etablierten Kulturindustrie in die Domäne der Anwender. Diese erwerben und entwickeln Wissen über Technik und tragen durch die Aneignung elektronischer und softwarebasierter Konsumgüter zu deren Weiterentwicklung bei. Darüber hinaus zeigt das Beispiel des so genannten Web 2.0, daß innerhalb der Kulturindustrien neue Geschäftsmodelle entstehen, in deren Zentrum nicht mehr die Produktion und Verbreitung von Medieninhalten steht, sondern das Angebot von

Plattformen, auf denen die Konsumenten eigene Medieninhalte produzieren, oder jene aus dem großen Reservoir der Medienindustrie bearbeiten. Um eine ideologisch determinierte Definition von Partizipation zu vermeiden, werden User-Aktivitäten hinsichtlich ihres Handlungspotential und dem Grad der sozialen Interaktion als explizite und implizite Partizipation unterschieden.

Explizite und implizite Partizipation

Die vorliegende Arbeit unterscheidet *explizite* und *implizite* Partizipation. Die explizite Partizipation erscheint oft als kollektiver Prozeß der Technikappropriation in Teams, User-Communities oder anderen Kollektiven, die implizite Partizipation beschreibt die Automatisierung von Anwenderaktivitäten, sowie deren Implementation in Softwaredesign und in neue Geschäftsmodelle.

Heterogene und hybride Partizipation

Die Partizipation von Anwendern wird als *heterogen* und als *hybrid* definiert.
Die Heterogenität zeigt sich in den unterschiedlichen sozialen Kontexten der Anwenderaktivitäten, sowie in deren individueller Motivation und den unterschiedlichen Fähigkeiten Technik anzuwenden. Hinzu kommt die Dynamik der Interaktionen zwischen dem kommerziellen Sektor der Kulturindustrie und der Domäne der Anwender.
Hybrid erweist sich Partizipation in sozio-technischen Ökosystemen, in denen eine Vielheit von Anwendern in Interaktion mit Technologien kulturelle Produktion leistet. Oftmals wird das Handlungspotential der Informationstechnik übersehen. Dabei trägt das Design in Interaktion mit den Anwendern maßgeblich zur Performativität einer Web-Plattform bei. Das Wissen der Anwender über Technik und ihre Appropriation von Design trägt dazu bei, daß die Verhältnisse zwischen etablierten Produzenten und der Domäne der Anwender neu verhandelt werden müssen. Dafür gibt es drei Möglichkeiten, *Konfrontation, Implementation und Integration.*

Konfrontation, Implementation, Integration

Konfrontation bezeichnet die Abwehrstrategie etablierter Medienunternehmen, User-Aktivitäten durch Rechtsmittel zu kontrollieren. *Implementation* beschreibt die Strategie, User-Aktivitäten in neue Geschäftsmodelle zu implementieren und mit Hilfe von Softwaredesign zu steuern. *Integration* hingegen demonstriert die Transformation des Wissen über Technik zu einer sozialen Praxis einer technologischen Kultur. Anwender und Unternehmen entwickeln nicht nur gemeinsam Design, sondern verhandeln auch über den gesellschaftspolitischen Rahmen, in dem diese Aktivitäten stattfinden. Dies könnte ein Modell für eine partizipative Kultur sein, in der technische Leitmotive durch gesellschaftsweite Debatte und demokratische Entscheidungsfindung definiert werden.

Samenvatting

User participatie en de uitbreiding van de culturele industrie

De computer en het internet ontwikkelden in de afgelopen 20 jaar tot alledaagse media en brachten nieuwe vormen van culturele productie en sociale interactie met zich mee. De introductie van deze media werd begeleid door een populair discours, dat sociale vooruitgang beloofde door technologische ontwikkeling. De computer en vooral het internet werden gepresenteerd als media die niet alleen geografische afstanden konden overbruggen maar ook sociale verschillen. De nieuwe technologieën maakten het inderdaad mogelijk datleken en onprofessionele gebruikers inmiddels kunnen participeren binnen de culturele productie. Tevens werd de amateurcultuur, die al voor het digitale tijdperk een vast onderdeel van de traditionele culturele industrie was, door het internet wereldwijd verspreid. Het fenomeen van een culturele productie buiten de traditionele culturele industrie werd beschreven als *participatory culture*. Toch lijkt de participatory culture veel meer te

beloven dan waargemaakt kan worden

Dit onderzoek analyseert de participatie van gebruikers in de context van het populair en wetenschappelijk discours, van technologisch design en toe-eigening. Het beweert dat, in plaats van een omdraaiing van de productieomstandigheden ten gunste van de gebruikers, er sprake is van een uitbreiding van de traditionele culturele industrie naar het domein van de gebruikers. Binnen dit domein wordt kennis over techniek ontwikkeld en innovatie bevorderd door de toe-eigening van softwaregebaseerde producten. Verder laat dit onderzoek aan de hand van het voorbeeld van het zogenoemde Web 2.0 zien dat de culturele industrie in staat is om nieuwe businessmodellen te ontwikkelen. In plaats van zelf media content te produceren worden platformen aangeboden, waarop gebruikers media content creëren. Om niet langer een ideologisch gedetermineerd begrip van participatie te hanteren, beschrijft dit onderzoek participatie ten opzichte van het handelingspotentieel en de sociale interactie van de gebruikers.

Explicite en impliciete participatie

Dit onderzoek onderscheidt *explicite* en *impliciete* participatie. Terwijl explicite participatie terug te zien is binnen het collectieve proces van de toe-eigening van techniek door teams, user-communities of andere groepen, kan implicite participatie beschouwd worden als de automatisering van gebruikersactiviteiten en als de implementatie daarvan in softwaredesign en nieuwe businessmodellen.

Heterogeen en hybride

De participatie van gebruikers word als *heterogeen* en *hybride* gedefinieerd. De heterogeniteit is niet alleen terug te zien in de verschillende sociale contexten waarin gebruikersactiviteiten gesitueerd zijn, in de individuele motivaties en in de verschillende technische vaardigheden, maar ook in de dynamische interactie tussen de commerciële culturele industrie en het domein van gebruikers. Hybride is

participatie ten opzichte van socio-technologische ecosystemen, waarbinnen een groot aantal gebruikers en het technisch design samen culturele productie constitueren. Vaak wordt het handelingspotentieel van informatietechnologie onderschat, maar dit is in feite cruciaal voor het functioneren van een webplatform.

De kennis over techniek van de gebruikers en hun vaardigheden om zich design toe te eigenen leidt in de uitbreiding van de culturele industrie naar drievoudige dynamieken zoals *confrontatie*, *implementatie* en *integratie*, die een nieuwe verhandeling van de verhouding tussen producenten en gebruikers beschrijven.

Confrontatie, Implementatie en Integratie

Confrontatie kenmerkt de strategie van de traditionele mediaondernemers om gebruikersactiviteiten door middel van wettelijke rechtsmiddelen en ondersteunende technische systemen te controleren. Implementatie beschrijft de strategie om gebruikersactiviteiten in nieuwe businessmodellen te integreren en met hulp van softwaredesign te sturen. Integratie, daarentegen, demonstreert een transformatie van kennis over techniek naar een sociale praktijk van een technologische cultuur. Gebruikers en ondernemingen ontwikkelen niet alleen samen design, maar onderhandelen ook over de maatschappelijke context waarbinnen deze activiteiten plaatsvinden. Dit zou een model voor een participatiecultuur kunnen zijn, waarmee een maatschappelijk geaccepteerd begrip van techniek en het gebruik daarvan binnen debatten en democratische beslissingsprocessen gedefinieerd zou kunnen worden.

Curriculum Vitae

Mirko Tobias Schäfer was born on 15 March 1974 in Tübingen (GER). After graduating from the Mörike-Gymnasium in Göppingen in 1996, he enrolled at Vienna University in Austria. Mirko studied theater, film and media studies and communication studies at Vienna University (A) and digital culture at Utrecht University (NL). He obtained a magister (master) in philosophy from the University of Vienna in 2002. From 2000 to 2002 Mirko was organizer and co-curator of [d]vision - Vienna Festival for Digital Culture. After his graduation from Vienna University he went to Utrecht University (NL) as a junior teacher and researcher where he also wrote his dissertation on participatory culture. Mirko publishes on modified electronic consumer goods, software development and the socio-political debates on information and communication technology. He is currently an assistant professor at the University of Utrecht at the Department for Media and Culture Studies

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