



## »You will Shape the Digital Society with Your Knowledge – Make It Happen!«

Conference on Communications – A Common Playground  
for Social and Telecommunications Scientists

2010, May 26<sup>th</sup> – 28<sup>th</sup>

Conference sponsored by

· · · **T** · · · **Systems** ·



**Imprint**

Editor: The President of TH Wildau [FH]

Published by: News & Media · Marcus von Amsberg, Berlin  
Wildau/Berlin 2010

All rights reserved.

ISBN 978-3-936527-23-0

Conference Volume

**»You will Shape the Digital  
Society with Your Knowledge –  
Make It Happen!«**

Conference on Communications –  
A Common Playground for Social  
and Telecommunications Scientists

2010, May 26<sup>th</sup> – 28<sup>th</sup>

**Chairmanship**

Prof. Dr. Bernd Eylert, TH Wildau [FH]

The conference was organised to honour his  
academic farewell and his 60th birthday.

**INTRODUCTION****5** *Bernd Eylert*

“You will Shape the Digital Society with Your Knowledge – Make It Happen!” Introduction to the conference by the conference chairman

**11** *Johannes Meier*

Seven types of ambiguity – The role of communications in our modern media society

**THE ROLL OF COMMUNICATIONS AND SOCIAL SCIENCES IN THE MEDIA SOCIETY****21** *Joachim R. Höflich*

Living in a Mediated World. Communication Technologies and the Change of a Media Ecology

**39** *Jane Vincent*

Body to Body Interaction in Broadband Society

**55** *Julian Gebhardt*

Media & Communication Studies – How they (can) inform Design

**65** *Richard H. R. Harper*

Combined Imaginations. The Workings of Sociology and Computer Science in Communications Technologies Research Laboratories

**95** *Bernd Wiemann*

Future Challenges for the Telecommunication Industry Regarding the International Delphi Study 2030

**105** *Jochen Viehoff*

Claude Shannon – Juggler of science

**113** *Christian Rauch*

Ethics & sustainability – necessary crosssectional skills for scientists and engineers

**THE INFLUENCE OF INDUSTRIAL ASSOCIATIONS ON THE DEVELOPMENT OF THE MODERN MEDIA SOCIETY****119** *Vincent Chan*

Introduction

**121** *Alan Hadden*

Perspectives of the Global mobile suppliers association (GSA)

**ABSTRACTS & POSTERS****130** *Karoline Bergmann, Frank Ziarno*

Internet glasses and the informational right of self-determination; Are we allowed to do everything we're capable of?

**132** *Sven Bathke, Dennis Dornbusch, Timo Schmidt*

Project Google Street View

**134** *Martin Eras*

Customer integration as an opportunity to market success in the telecommunications sector

**136** *Martin Eras, Thomas Zeh*

LTE – The real mobile Broadband?

**138** *Tony Goldmann*

Symad-mobile

**140** *Nele Heise*

Human-Computer-Interaction (HCI): Perspectives of communication science: appropriation and technological change

**142** *Daniel Schmohl-Linsenbarth, Matthias Rumpf, Christoffer Groß, Martin Schern, Mathias Pape, Wolfgang Price, Tim Raschmann*

CrashAlerter

**144** *Fabian Hemmert*

Digital Resistance: Making Computers Stiff, Scratchy and Stubborn

- 146 *Michael Höynck, Daniel Starke*  
Communication on general aviation airfields in cases of emergencies
- 148 *Dany Janz, Johannes Koslowsky*  
The influence of electronical games on the mobile phone development and their value for the user.
- 150 *Thomas Kistel*  
Case study: Benefits and hazards of the introduction of radio-frequency chips (RFID)
- 152 *Daniela Stärke, Stefan Kramer*  
Mobile Phone as an Everyday Life-style Object: The move from “plain old mobile” to “electronic brain in your pocket”
- 154 *Gesa Ruge*  
Filmic Representations of Human Computer Interaction in Games
- 156 *Alexander Müller, Tom Bieling, Jan Lindenberg, Gesche Joost*  
StreetLab: Co-Designing ICT Concepts with Children and Teenagers

#### BERND EYLERT FINAL LESSON

- 159 *Bernd Eylert*  
Academic farewell
- 161 *Bernd Eylert*  
Die Bedeutung der Mathematik im täglichen Leben eines Ingenieurs (The Importance of Mathematics in an Engineer’s Every Day’s Life)

#### 177 STUDENT AWARDS

## “YOU WILL SHAPE THE DIGITAL SOCIETY WITH YOUR KNOWLEDGE – MAKE IT HAPPEN!”

### Introduction to the conference by the conference chairman

*Bernd Eylert*

This title is meant as a wake-up call for all students, but specifically for students studying social sciences, communications and telecommunications or electrical & electronic engineering. For more than a decade students of these subjects have had to be prepared for a new society which is called the *digital society*. However, quite often students of all these subjects do not know enough about each other and their specific work. If I look into my own field, my message for almost a decade has been: *Engineering students need to know more than just all about technology and how it works*. We, representatives and teachers of technical universities, prepare our students for their future business in terms of specific technologies, but do we prepare them for life? A modern telecommunications engineer must know his or her original business very well, that means expertise in specific technology, but that also includes soft skills: personality, human engineering, economic & ecological processes, culture and political aspects, and much more. That means that we, the university professors, must prepare the next science generation for a digital society which comprises more than just technology. The next generation scientists will shape the digital society and we must give them the tools and teach them to use the tools to be prepared for their future job(s).

I came across with this idea around the year 2000, when I was the Chairman of the UMTS Forum. One of my colleagues, Steve Hearnden, Ex-British Telecom Manager, and at that time the programme manager of the Forum, did know about the work which his former workmate, Jane Vincent, was doing in the Digital World Research Centre (DWRC) at Surrey University in Guildford. Jane was working with Richard Harper, who is a professor in Guildford and additionally with Microsoft in Cambridge, UK. Jane, as a social scientist and experienced with a technology company (BT), was able to combine the technical and social aspects a modern telecom organisation needs. I learned at that time that an international organisation lobbying for a new telecommunications system needs to ally with social scientists in order to understand customers’ expectations. When I worked for Deutsche Telekom to prepare the company for the next mobile communication generation called

UMTS in the mid-1990s I had people from different fields in my cross-company team as well, but the isolated interests of each department seemed to be bigger than the common success of the company at that time. In the Forum I was much more successful with the interdisciplinary work. An international group may perhaps be more interested in common success. DWRC delivered two very interesting studies on shaping the technology to prepare operators and suppliers for the third generation of mobile communication – multimedia access from everywhere and anytime. A subcontract was given to Joachim Höflich, professor for Communication sciences at University of Erfurt, which was an important step for our future cooperation on this subject.

All three, Jane, Richard and Joachim, kindly accepted my invitation and they will guide us through the conference.

In 2005 I introduced a subject called “Telecommunications & Society” into the syllabus of the master’s degree programme in Telematics at our Technical University, run as a seminar. This subject allowed students to think “outside of the box” and gave them a better idea about how to deal with complicated problems when they enter into business about two years after the seminar. *Telecommunications* is nothing that stands for itself; it is part of a more general cultural field of *Communications*. In this respect the interdependence between the most popular telecommunication gadget today, the mobile phone, and society is of special interest. Finally, this project and a participation of some of my students together with myself in a conference at Erfurt University in 2008, organised by Joachim Höflich, were what prompted me to finish my own academic carrier with a conference on communications as a common playground for social and telecommunications scientists. Although the speakers of this conference are experienced industrial and scientific leaders the focus will be on postgraduate students. They will present their scientific projects in poster sessions and take the opportunity to enter into dialogue with key people in this field.

I have already introduced some of these key persons. Now I would like to present the other speakers and their specialities. Let me start with Julian Gebhardt.

By chance I made contact with Julian Gebhardt, the Co-Chairman of this conference, some years ago. At that time Julian had a contract at UdK, University of the Arts in Berlin, and I was able to convince him to join my seminar and explain to my students how communications scientists as social scientists work in the field of mobile communications and with the internet. It was very useful and forward-looking for my students to learn how social scientists think and to work. When I asked him to support me in preparing and running this conference he jumped immediately on the bandwagon. I am very pleased that we have been able to work so well together in recent years.

The keynote address will be given by Johannes Meier, a former member of the board of directors at Bertelsmann Stiftung, one of most renowned and influential foundations in Germany. Most German-speaking academics at this conference know the Bertelsmann Stiftung through the CHE process of evaluation of German, Austrian and Swiss universities. Johannes is a trained physician with international experience, knowing much about the inter-relationship of science and society. He has left Bertelsmann to run his own company Xi. I am very pleased to have him here.

Another key person from inter-media business is Andreas Nungesser, an old comrade from German Air Force, where we served together. Andreas is a journalist with Zweites Deutsches Fernsehen (ZDF) and he is familiar with TH Wildau. I invited him some years ago to support me in training our students to deal with the press, print and especially the fluent media (all kind of broadcasters). This project is very successful in the Telematics master degree programme. Our students emerge from this training with a completely new view of the power and importance of the print and fluent media and how important it is for engineers to address all kinds of media appropriately for their own advantage.

I have known Mike Walker, the former head of Vodafone Group’s R&D business and professor for Mobile Communications at the famous Royal Holloway College, London, for a long time. I met him about 20 years ago through standardisation work on ETSI, the European Telecommunication Standardisation Institute, based in Sophia Antipolis in southern France. Over the years we worked closely together on R&D for GSM and UMTS. He was Vodafone’s representative in the UMTS Forum during my time of office. My students know him also as the chief cryptologist on GSM and UMTS in the SAGE group. Mike and I have supervised a couple of master students together at Wildau University. As Mike has not visited TU Wildau yet, he immediately accepted my invitation to this conference and I am very pleased he is here.

Another good old friend from my former business is Dirk Poppen. Together with Peter Meissner, the present CEO of NGNM, who unfortunately could not make it for this conference as he is in Shanghai, Dirk represented E-plus in the UMTS-Forum, but I have known Dirk even longer. When he finished his studies on electrical and electronic engineering, specifically OFDM, at TU Braunschweig in the early 1990s he asked for a job with the Central Office for Mobile Communications (ZfM) where I was running the department on New Products, but E-plus was quicker. Presently, he is responsible for E-plus’s LTE auction process and may report a bit on that subject as well.

Another long-standing friendship is with with Alan Hadden, Jean-Pierre Bienaime, Adrian Scrase and Klaus Vedder; a warm welcome to them as well.

Alan was the Programme Manager of the UMTS Forum during my office as Chairman and for more than a decade has been the President of the Global Suppliers Association (GSA), a lobbying group for the mobile manufacturing industry. In this function he has been a very successful lobbyist over the last 15 years and knows the evolution from GSM to LTE very well. He will put his experience into the context of mobile communications and the digital society.

Jean-Pierre followed me as the Chairman of the UMTS-Forum in 2003 and placed me in the honourable position of a Chairman emeritus. He is in his fourth elected period and runs the Forum successfully. The Forum still has a respected voice in the mobile community. Jean-Pierre will discuss the influence of international organisations together with Alan and Adrian Scrase.

Adrian is the CTO of ETSI and we have spent a lot of time in lobbying for UMTS in many organisations, especially in 3GPP and at a lot of conferences. Some years ago Adrian gave a paper on “Mobile Evolution towards LTE” here in Wildau in my class on mobile communications.

Klaus is one of the founding fathers of the SIM card for GSM and the next generation of mobile communications. The Central Office for Mobile Communications of Deutsche Bundespost (ZfM) produced the SIM cards for its and T-Mobile services and outsourced this business a couple of years ago to Gieseke & Devrient, where Klaus is Member of the Board of Directors. Klaus has sent his head of R&D, Wolfgang Rankl, year by year into my lesson on IT Security to give my students the latest update on security management on SIM cards, dongles and other access technologies for mobile phones, laptops, notebooks etc. Klaus is a great moderator and he will run two panels at this conference.

With respect to the R&D world I would like to welcome four colleagues I have come into contact during my professorship at Wildau University. First of all I address Bernd Wiemann, the Managing Director of Vodafone’s R&D branch in Munich, Germany. About five years ago I contacted Bernd regarding good topics for master’s theses. We worked out a couple of good ideas and finally a handful of students wrote their theses with Vodafone, looked after by Martin Richartz and Christian Rauch, supervised by Mike Walker and myself. Bernd will highlight the *Future Challenges for the Telecommunication Industry Regarding the International Delphi Study 2030*, an initiative of the Münchner Kreis together with European Center for Information & Communication Technologies (EICT) and the German mobile industry. Bernd and Christian are also the founding fathers of the amina Stiftung, a non-profit foundation working on ethics for modern companies. Members include bigger and smaller companies, ministries and universities. Christian will highlight this item in this conference.

Referring to R&D activities I asked Heinrich Arnold, member of the board of directors of Telecom Laboratories in Berlin, Germany, to explain Telekom’s views on innovation, open and user driven.

Last but not least, I am very pleased to welcome a good friend from America, Vincent Chan. Vincent holds the Claude Shannon chair at Massachusetts Institute of Technology (MIT) in Cambridge, USA, and I think for all communication scientists it is a dream to work at the place where the father of modern communications, Claude E. Shannon, started his studies on communication technology about 60 years ago. It is a good opportunity to mention at this place that the Heinz-Nixdorf-Museums Forum, Paderborn, will start an exhibition on “Codes and Clowns. Claude Shannon – the Juggling Scientist” at the Museum of Communications in Berlin in May 2010. This exhibition deals with the multi-talent of Claude Shannon, who was not only an excellent scientist, but also a good juggler. Vincent and I came together more than a year ago, when with four other colleagues from all around the world we advised the Irish Authorities on their R&D programme on telecommunications for the period 2009–2014. Very familiar with industrial influence on science and society, Vincent will give his academic view on this subject and moderate a session on this topic on day 2 of this conference.

Ladies and Gentlemen, it is a great honour for me that the Technical University Wildau, namely our President, Prof. Dr. Laszlo Ungvári, organised this conference for my academic farewell and that you all have accepted this invitation. I wish you a great and informative conference and a pleasant stay in Wildau and Berlin.

**Author:**

Prof. Dr. Bernd Eylert

Professor für Mobilkommunikation/M-Commerce

TH Wildau [FH]

bernhard.eylert@tfh-wildau.de

## SEVEN TYPES OF AMBIGUITY – THE ROLE OF COMMUNICATIONS IN OUR MODERN MEDIA SOCIETY

*Johannes Meier*

### Introduction

Looking at the role of communications in our modern media society is always something personal. Communication is at the heart of our process of navigating in life and assigning meaning. Communications is a reflexive process where the acts of communicating change the semiotic codes that underlie all communications and understanding. As new technology allows for new roles of communications our personal cultural and social context is changing as well.

On the one hand, I view this changing role of communications in the modern media world with concerns:

- As a father of four children I observe the disappearance of boundaries between real and virtual relationships due to facebook, icq, schuelerVZ or WoW. Are relationships between players in a MMOG (massively multiplayer online game) such as WoW (world of warcraft) real, reliable, serious?
- As an avid reader of books I am struck by the fact that many managers feel that reading PowerPoint charts provides all the insight necessary for decision making. Can all management problems really be reduced to a few bullet points?
- As a citizen I am frustrated by political talk shows made up of sequences of unconnected two-minute sound bites. Where are formats that allow exploring fundamental changes in our society such as demographics, globalization or climate change and their implications?
- As a computer scientist I am wondering what Claude Shannon might have said to the way modern media deals with information. According to Shannon a message is informative if the chance of its occurrence is small. How many of the large number of communication messages that reach me through modern media in the course of a day are surprising or interesting?

On the other hand, I cannot even imagine a life without modern communication tools.

- I am fascinated by the way search engines connect me to information sources.

- I rely on embedded sensors for a lot of comfort whether in my car or in my house.
  - Interactive visualization tools provide me with ways “to communicate with data sets”, to explore complex patterns.
  - I love pulling together a set of podcasts before a long train ride.
  - I am excited about the potential for our political system that arises from feedback loops built into online decision-making tools.
  - I am back in touch with friends we met while living abroad due social networks.
- In short, I feel ambiguous about the role of communications in the modern media society.

In the following I will explore this ambiguity in more depth. Borrowing the title of a wonderful novel by Elliott Perlman<sup>1</sup> let me present to you seven types of ambiguity. This paper summarizes the key notions from a presentation at the conference that can be downloaded from the web.<sup>2</sup>

## Exponential growth of communication technology

Information and communication technology grow exponentially in terms of performance as was most famously formulated in Moore’s law. In fact, exponential growth is driving all components of communication technology: average transistor price, microprocessor cycles, or bits shipped. Every form of communications technology is doubling price-performance capacity every 12-18 months.

This results first of all in cheap access to vast amounts of information across the world. The opportunities from this access to information and communication capabilities are evident. I find it hard to realize that youtube or facebook are actually still in their early infancy if any measure of a typical corporate lifespan is applied. It is also important to realize that parallel to the Internet connecting people is an explosive growth of the Internet connecting “things” via embedded sensors. Thus, we live in a sea of data that captures and stores in more and more detail every little change in our lives and our contexts.

Also access is increasingly ubiquitous across the world with mobile phones, cheap netbooks and wireless sensors reaching even remote rural areas in developing countries. There is still a digital divide, but the cost reductions due to the exponential growth of the technology make the prospect of a whole world that is to a very large extent digitally connected very likely.

1 Elliott Perlman, *Seven Types of Ambiguity*, Riverhead, 2004.

2 <http://johannesmeier.com> or <http://www.slideshare.net/jm1963>

Nevertheless, exponential growth also entails challenges. Are we prepared for the prospect that within a generation computers will be able to compute  $10^{16}$  calculations per second per \$1000, which is about the computing power of a human brain as Ray Kurzweil has pointed out?<sup>3</sup> What are the implications of  $10^{26}$  calculations per second per \$1000, i.e. the computing power of humanity, within two generations?

Such questions are fundamental. To prepare humanity for this accelerating technological change singularity university was founded in 2008 to assemble, educate and inspire a cadre of leaders who strive to understand and facilitate the development of exponentially advancing technologies and apply, focus and guide these tools to address humanity’s grand challenges.<sup>4</sup>

More immediately, the exponential growth of technology makes new communication architectures possible which leads to my second ambiguity.

## Amateurization of publishing

In the past mass communication was characterized by a 1-n architecture: a publisher or broadcaster could reach thousands or millions of receivers. The need for a 1-n architecture was to a large extent driven by the high fixed cost of sending or broadcasting content. This cost structure has changed dramatically with the arrival of the Internet. As the cost of publishing content on the web is negligible for the individual, we now can realize m-n architectures of publishing and communication. Internet users have embraced this opportunity with vigor: 133.000.000 blogs were indexed by technorati from 2002 to 2009. And there is no end in sight: just take a look at the worldometers<sup>5</sup> for a sense of the real-time growth in messages and blogs.

These statistics mark the rise of the amateur that is often derided by traditional publishers. True, not all of these blogs are particularly interesting; most blogs have only very small audiences, as both publishing of web-content and reception tend to follow a long-tail distribution. But many blogs fill a niche – provided you can find the relevant blog.

Given these huge numbers of “publishers” there need to be filtering mechanisms. The filters need to be automated or rely on the amateurization of evaluation, for example via votes by the readers. By navigating the landscape of this m-n publishing architecture under the watchful eyes of search engines our behavior becomes part

3 <http://kurzweilAI.net/>

4 <http://singularityu.org/>

5 <http://www.worldometers.info/>



of the voting mechanism. Clearly, this is no guarantee for quality assurance as the wisdom of the crowd may not always be truly wise. In fact, one central challenge in shaping the digital society is to learn more about the applicability and key factors of success of the wisdom of the crowd. When does true wisdom of the crowds materialize and what are prerequisites for its emergence? When does the virtual crowd turn into a virtual mob?

These questions are essentially political questions, which are connected to my third ambiguity.

### Mobilizing political participation

The blogging phenomenon or the twittering of millions of users all point at the appeal of participation via the web. The potential for political participation is obvious. Barack Obama's presidential campaign relied heavily on myBO.com to reach its most passionate supporters cheaply and effectively. During the campaign volunteers created more than 2 million profiles on the site, planned 200.000 offline events, posted 400,000 blogs and raised \$30 million on 70,000 personal fund-raising pages.<sup>6</sup>

However, I believe that political participation mechanisms that are web-enabled are highly dependent on the cultural context. Direct attempts to transfer U.S.-style formats for political online community building without paying adequate attention to the cultural context tend to result in helplessly funny formats as evidenced in some online activities by German political parties during the 2009 election.

Even more critical is the potential for manipulation in the Internet. From my point of view the key challenge in designing platforms for political participation is to build trust and to ensure legitimacy by leveraging transparency. Let me illustrate this with an example of a project that I initiated while at the Bertelsmann Foundation. 400 citizens forming a representative sample were invited to create a citizens' forum for defining the agenda of a social market economy. They met in a kick-off conference to identify the key headings and issues. Thereafter they collaborated in an online platform to develop key proposition. The program was combined and voted on at a final conference. The whole process was supported by web 2.0 technologies – online voting, wikis, chats, blogs, and virtual access to experts. Interestingly, within 3 months more than 20.000 posts were entered into the platform and a program of high quality emerged. The Bertelsmann Foundation in collaboration with the Nixdorf Foundation was careful only to orchestrate the process

6 <http://www.fastcompany.com/magazine/134/boy-wonder.html>

and provide the platform for participation and not provide content input in order to ensure legitimacy of the end product.<sup>7</sup>

Such forms of participation are only possible because the users of the platforms can communicate whenever they want either synchronously or asynchronously. However, such continuous communications form my fourth ambiguity.

### Continuous communications

Continuous availability of communications technology means that we all can be reached continuously independent of where we are. Boundaries between spheres of life are blurring. An espresso bar with a WLAN is a workplace – at least for the so-called creative class. With smartphones and netbooks as standard equipment many modern workers take their work into their evenings, weekends and holidays.

The numbers are impressive:

- The Radicati group estimates that e-mail volume has grown from 31 billion e-mails in 2003 to 247 billion in 2009.<sup>8</sup> Think of the pressure resulting from these emails as many of us expect an answer to an email within 24h.
- Typical U.S. teenagers send and receive 50 text messages per day, with one in three exceeding 100 text messages per day according to the Pew Internet survey.<sup>9</sup>
- If you think that 3000 or more messages per month are absurd, let me point out that the blackberry of a typical manager will interrupt the day at least as often with its vibrating alarm indicating the arrival of a new e-mail or SMS. In meetings you can see managers continuously screening their communication devices for the latest message that might be important.

In his recent book "Payback" Frank Schirrmacher has pointed out that we are putting ourselves constantly on high alert.<sup>10</sup> However, a continuous alarm is not any more information – remember Shannon's definition of information – but just noise and disturbance of the peace.

Schirrmacher observes that after a disruption of an activity, e.g. by an incoming e-mail, it takes on average 25 minutes to return to the original task. We simply tend to forget what we were doing and the disruption often leads to some new activities that are being pursued in parallel. As Herbert Simon had already realized in 1972 a

7 <http://www.buergerforum2008.de/>

8 <http://www.radicati.com/>

9 <http://www.pewinternet.org/topics/Teens.aspx>

10 Frank Schirrmacher, *Payback*, Blessing, 2009

large flow of information can lead to a deficit of attention. There may not be enough attention for all the incoming information to deal with them constructively and to produce deep insight if we stick to this pattern of continuous interruptions.

Continuous communications is linked to a world built for speed. Take the following book titles: speed walking, speed reading, speed climbing, speed dating, the one-minute manager, the one-minute sales person, or even one-minute bedtime stories. However, there is a growing sense that the fast life is not a synonym for the good life. While there are calls for slowing down, it is often hard to follow this advice. Even when you turn off your communication devices, your inbox continues receiving. After your break you usually need to do a lot of catching-up. That is why we need intelligent agents to help us sort through these communication flows, or even automate answers. Such technologies are increasingly available. However, they rest on my next type of ambiguity: individualization.

## Individualization

The modern communications infrastructure produces vast amounts of data for each individual. Not only do we enter our personal data into user profiles, any transaction, search, navigation and movement in the digital world tends to leave traces. All those traces can be collected to produce ever more complex individual profiles. As users further enter their personal goals as the basis for networking into web applications, it becomes clear that deeper and deeper levels of our inner self become available for statistical analysis. It needs to be emphasized that it is not Big Brother collecting this information in order to supervise us in most cases, but it is the consumer who willingly bares his soul and puts intimate details up for display to find the tailored product, service, bot or mate with the help of the statistical algorithms.<sup>11</sup>

Modern technology allows to auction off web-banners within milliseconds between the call of the URI and the display of the page based on the individuals' current browsing path and transaction history. At what point is the combination of massive data sets and algorithms and real-time individualization effectively predictive for our behavior? Schirmacher even points at the danger that a world of predictions might turn into a world of determinism: "We want to identify who we are, by identifying what everybody does."<sup>12</sup>

<sup>11</sup> Take as an example: <http://43things.com/>

<sup>12</sup> „Wir wollen herausfinden, wer wir sind, indem wir herausfinden, was alle tun.“ Schirmacher, Payback.

As individualization is progressing, the quest for commonalities becomes more difficult. We can no longer reference the same evening TV-program that was watched by half the nation some 25 years ago. Individualization makes communication across boundaries, across different backgrounds more relevant and more challenging at the same time. The fact that we may be constantly sending from our individualized vantage points does not imply that we can also listen.

This raises the question of intimacy, my sixth type of ambiguity.

## Intimacy

Technology anthropologist Stefana Broadbent tells a story of intimacy being created with the help of modern communication technology. Immigrants from Kosovo have rigged large screens, webcams, and Skype so that the family abroad and the grandmother back in Kosovo can see and talk to each other during mealtimes.<sup>13</sup> She has also observed that on social networks, Skype or IM platforms intense communication patterns usually cover only a very small and intimate circle of friends – suggesting that the term “friends” in facebook may be a slight misnomer.

At the same time one cannot escape the impression that sitting alone in front of a keyboard has a different quality of intimacy than sitting together in a café. Yet, many of us now write more to our friends electronically than talk to them.

The question is how the types of connectivity enabled by the modern communications technologies will influence our notions of intimacy. Interestingly enough, Cisco is positioning its high-end telepresence rooms as a substitute for business travel and meetings, not as just a better videoconferencing technology.<sup>14</sup>

As the digital and the physical world become more integrated major attitudinal and behavioral shifts are to be expected. The key question for me is whether this new context will result in better understanding and better actions, which is my last type of ambiguity that I want to present.

## Understanding

I am concerned that modern - especially corporate - communications are driven by an unhealthy desire to either simplify complex patterns into a bullet point list or translate them into a cluttered PowerPoint graphic.

<sup>13</sup> [http://www.ted.com/talks/stefana\\_broadbent\\_how\\_the\\_internet\\_enables\\_intimacy.html](http://www.ted.com/talks/stefana_broadbent_how_the_internet_enables_intimacy.html)

<sup>14</sup> <http://www.cisco.com/en/US/products/ps10753/index.html>

I am joined in this concern by U.S. generals who have seen a steady rise of PowerPoint presentations in the military. Brig. Gen. H. R. McMaster even banned PowerPoint presentations by his officers when he led the successful effort to secure the northern Iraqi city of Tal Afar in 2005: PowerPoint is “dangerous because it can create the illusion of understanding and the illusion of control. Some problems in the world are not bullet-izable.”<sup>15</sup> Equally unproductive for reaching understanding is the attempt to squeeze every bit of available information into a PowerPoint chart. The U.S. military or consultants provide poignant examples.

On the other hand many wonderful tools for analysis and visualization are emerging as part of the modern communications and computation infrastructure. Take as examples the insights we can gain by exploring data or hypotheses with gapminder<sup>16</sup> or OECD explorer<sup>17</sup> or wolframalpha<sup>18</sup>. These tools allow us to move efficiently beyond data to information and to knowledge by supporting interactive analysis and exploration.

I believe that the modern communications infrastructure provides us with increasingly more powerful tools that allow individuals and organizations to deal with complex patterns and heterogeneity without falling into reductionist traps. New technologies allow for new architectures of cognition and participation. Shared contexts develop not only through real interaction and participation, but increasingly through virtual environments. Interaction and transaction costs are falling dramatically so that the concept of personal experience is fundamentally changing for most of us.

This development has a profound impact on coordination and steering paradigms. However, not in the naïve way that new order automatically develops through self-organization via blogs, wikis and virtual communities. Order and understanding tends not to develop endogenously in contexts of high complexity and dynamics. Rather order that increases coordination capacity and productivity needs targeted investments in the form of precise architectures of platforms where steering impulses interact with dynamic self-organization.

I would like to illustrate this point with a prototype of a coordination and communication platform of the German Employment Agency (BA), the labor market monitor, that was developed by my company.<sup>19</sup>

<sup>15</sup> <http://www.nytimes.com/2010/04/27/world/27powerpoint.html>

<sup>16</sup> <http://www.gapminder.org/>

<sup>17</sup> <http://stats.oecd.org/OECDregionalstatistics/>

<sup>18</sup> <http://www.wolframalpha.com/>

<sup>19</sup> <http://xigmbh.de/>

The current economic crisis has surfaced limits of steering mechanisms that are based on broad-brush indicators. The economic crisis is affecting the various local contexts of the labor market in highly diverse ways. It becomes necessary to include context indicators to take account of the variance, such as industrial structure, qualification profiles, demographics or social capital. Any attempt of the center of the BA to map this local heterogeneity of contexts into ever more refined performance indicators is leading only to cumbersome data collection exercises and massive controlling efforts without capturing the local complexity in an adequate way. So the BA faces the steering challenge of increasing decentral complexity in the face of central needs for accountability and compliance.

Moreover, it is becoming very visible that even this large federal agency cannot solve many of the underlying problems on its own. Successful local transformations depend on many actors from different organizations aligning their resources and agendas. This calls for “round tables” and effective coordination of many stakeholders in the local labor market. It is critical, however, that the different perspectives of the actors are effectively aligned by shared understanding as the basis for joint action programs.

Given this situation, the BA has decided to implement a web-based coordination platform that allows employees of the BA and external actors to develop a shared understanding of the local situation, needs and potential – the labor market monitor. Such an open visualization of the coordination context goes beyond the conventional steering paradigm: It starts where conventional target setting mechanisms and contracts are no longer possible or not yet practical. The new steering impulse is embedded in the architecture of the new web-based reference system and interaction space. The role of communications is changing fundamentally aiming for a deep understanding across organizational boundaries with the help of the coordination platform.

**To summarize:** We need to embrace the above ambiguities. This means first of all to educate our children to deal constructively with these seven types of ambiguity as they will materialize more strongly over time.

Specifically, we need to

- understand the potential and implications of exponential growth in communication and information technologies,
- orchestrate the wisdom of the crowds in an age of amateurization of publishing,
- provide new avenues of political participation with the help of the web,
- safeguard attention and focus in times of continuous communications,
- balance the opportunities of individualization with civil liberties and a search for common causes,

- explore new forms of intimacy enabled by new communications technology,
- aim for deeper understanding rather than accept inadequate reductionism.

I would like to end these thoughts on the seven types of ambiguities regarding the role of communications by adapting a quote by Theodor Adorno: “What use is communications in the modern media world, if you have nothing worthwhile to say otherwise?”<sup>20</sup>

**Author:**

Dr. Johannes Meier  
 Managing Director  
 Xi GmbH, Germany  
 info@xigmbh.de

<sup>20</sup> „Was nützt einem die Gesundheit, wenn man sonst ein Idiot ist?“ (Th. W. Adorno) – brand eins Heft 6, 2006

## LIVING IN A MEDIATED WORLD

### COMMUNICATION TECHNOLOGIES AND THE CHANGE OF A MEDIA ECOLOGY

*Joachim R. Höflich*

#### New media as an eruption

New media are upsetting familiar practices of communication. Old practices do not meet the requirements of new medial challenges anymore and new practices have not been fully implemented yet. This development roughly evolves like this that **New Media** – (are leading to an) **Eruption** – (which is followed by a process of) **Adaption** – (which yet again leads to a) **Normalisation with new social arrangements**. Just like it is often with any other technological innovation an ‘adaption lag’ – similar to what Ogburn (1964) calls a “cultural lag”<sup>1</sup> – seems to occur, which means that behaviour or behavioural rules and patterns are lagging behind technological affordances, or, to take a term from Erving Goffman (1974: 8), a lag between (at least) two frames, so that it is not clearly indicated “what it is that’s going on”. Not only people have to re-orientate themselves in times of transition alas the time between new and old practices, but also researchers find this hard. In a way, it seems like new media are always also breathing new life into science. One might be reminded of the idea of development of sciences within the frame of “scientific revolutions”, like Thomas S. Kuhn (1967) phrased it. But while revolutions do not occur very often, eruptions do. They are based on two factors: The dealing with new subjects, such as new media, and the occurrence of theoretical discourses, whereby old theories need to be re-examined as well. One cannot look at communication studies, a discipline which primarily has to deal with medial developments, without having a continuous discourse about the concept of media.

Medial developments are often inflated, nay overrated. An example for that is the introduction of cable television in Germany. “Interactivity” deemed to be the new magic formula which at the same time pointed to a new era. It seemed to be the

<sup>1</sup> In the broadest sense a lag emerges if one variable changes to a much greater extent than an other variable because of an invention, with the consequence that the degree of adaption between the two variables is lower.

tool which could help to overcome the division between mass and individual communication and which could turn the passive recipient into an active user. As early as the Seventies and Eighties, the so-called feedback channel was a central (media-political) topic. It was a “political debate” which aimed to introduce cable television in Germany. Communication studies participated in this debate and hardly questioned the technological promises, although the actual lack of such a feedback channel had a sobering effect. It was talked up to a myth and whatever it promised – from dialogue ability over participation to cable democracy – was not feasible with the then available technology of the co-axial-cable (Höflich 2003: 7). As one can see, trusting technological promises can be deceitful. In addition to that, the “new” can be paralyzing and might block the sight of media-historical relations. This especially applies to engineers, “because engineers hardly ever read the history of technology”, as Santiago Lorente remarked (2006: 199). But also the opposite fact may apply, when the new is being underestimated and not being given a chance – or is simply being overlooked. The latter holds true for the telephone, a media, which is still being neglected by communication science. It is hard for media of interpersonal communication to stand their ground in communication science, which mainly dedicates itself to researching mass media and their effects. In Germany this was – and is – the case for mobile phone studies. The communication scientist Uli Lange (1989: 177) declared a mere fifteen years ago: “The fascination for mobile ‘personal’ terminals will nevertheless not culminate in the fact that every member of modern industrial societies will want to carry around such nice technological gadgets, however small they might be. There is a personal inhibition regarding the usage of mobile phones in public areas [...]. The desire to make calls in private and not in public does not only prevail out of reasons of comfort. Many callers are actively seeking the intimacy of a dyadic connection and are feeling disturbed by third parties.”

Beside an over- or underrating of a medium, the effects of new media can be estimated quite differently as well. Media-enthusiasts and media-sceptics tend to assume rigid attitudes. One only has to think of the discourses that have accompanied and respectively accompany the history of the internet. While one side saw a future world in front of them, where people communicate free from the thronging constraints of the real world in a virtual agora, regardless of their looks and place in society, the other side saw an alienation from the real world, an increasing communicative isolation of humans and a growing gap between different social segments. It seems that in Germany the second caste prevailed and still prevails. However, both groups are influenced by a media determinism, whereby a technological determinism is quickly being replaced by a social determinism. They look from media to people, and rarely the other way around. In a way they are both right, as medial

developments prove. Although it has to be said that this is not the case with regards to their media determinism, but for the effects of media, which are not only positive or negative, but often both at the same time.

### Duality of effects and of intermedial usage

The fact that media go with positive and negative effects can be called *duality of effects* following Mesthene (1972). The reason for this is that new media or new technologies do not only create new possibilities but also new problems: “New technology creates new opportunities for men and society, and it also generates new problems for them. It has both positive and negative effects, and it usually has two *at the same time and in virtue of each other*” (Mesthene 1972: 130). So the tight relationship between technological and social development helps to explain such a duality of effects. Mesthene (1972: 130/131) further explains in this respect: “The usual sequence is (1) technological advance creates a new opportunity to achieve some desired goal; (2) this requires (except in trivial cases) alterations in social organization if advantage is to be taken of the new opportunity, (3) which means that the function of existing social structures will be interfered with, (4) with the result that other goals which were served by the older structures are now only inadequately achieved” (Mesthene 1972: 130/131). Bausinger (2002: 19) expresses a similar view and states the following: “However, the result is two-sided: Technological progress always aims to solve problems, but the solution always brings along new, mostly unpredicted problems. It is a question of perspective whether or not you can call this on-going stream of problems, solutions and new problems progress.” Or as Naomi S. Baron (2008: 213) puts it in a nutshell: “Technology has always been Janus-faced.”

In this sense, contrasts are a characteristic feature of technology and especially media. The concept of Yin and Yang, as it is explained in Chinese philosophy, provides a good model for such a complimentary relationship and can be used for all kinds of contrasts, at least according to the early sinologist Marcel Granet. According to him this explains the willingness to see an antithesis of Yin and Yang in every contrast, as it obviously seems to express the character of each and every contrast (see Granet 1980: 92).

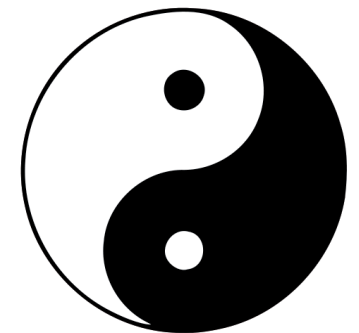


Figure: Medial relations – Yin and Yang as complimentary relationships

Such contrasts can be seen on different levels – from the individual to the social one. The main focus hereby lies on the actual usage of media alas how media are implemented into existing communicative practices – no matter if on an individual or social level. A duality of effects corresponds at the same time with a duality of structure (Giddens 1980) or respectively with a duality of technology (Orlikowski 1990). Communication technologies, just like every other technology, are products of human behaviour within a certain structural and cultural framework. They are accompanied by rules and resources, which enable and limit human acting in respective contexts. Looking at the social implementation of media into social practices – a “shaping of technology” – has two effects: The overcoming of a naïve determinism (may it be a technological, medial, economic, or social determinism) and an increasing reliance on the negotiability of technology (Williams/Edge 1996). Such “dualities” are not only forces of change, but also point to social disparities – inequalities and digital divides. Differences can therefore not only be observed between individuals, but also between groups, in the sense that one and the same medium is used in different ways and therefore produces different effects. It thereby always also depends on the level of control which individuals and groups have over a medium. A certain degree of acting freedom is given when for example an individual can decide for which purpose it will use a medium and when. However, acting freedom is limited, where this is not the case, for example when availability via mobile phone is imposed upon a person. Being able to control someone else’s medial behaviour (“setting the medium“) grants a certain amount of power over them.<sup>2</sup>

Examples from our own research show conflicting results time and time again. Observational studies on an Italian square (see Höflich 2006) – the Piazza Matteotti in Udine – showed among other things a duality of openness and closeness. On the one hand, the observed persons were moving around quite freely with their mobile phones, in the sense of “stage phoning” and one could even say they showcased themselves (incidentally, there were more men than women on that square/more men than women tended to do that). Others on the other hand preferred to withdraw into quieter corners. Another study, which was conducted in a university library (see Gebhardt, Höflich, Rössler 2008), showed that different groups of people are distracted on different scales by mobile phones. While students tend to hardly notice mobile phones any more, the library staff seems to take a whole different view on that. Differences in social segments can also be seen in a current study on the influence of mobile phones on our everyday life that, among other things, shows

that while younger people hardly have any problems at all to carry out their communicative activities in public, elderly people prefer to keep those things private. The study also indicates that there is a gender difference regarding the usage of the medium (see Höflich/Kircher 2010)

But media should not only be studied in isolation. German media reported in May 2008 that pupils of a secondary school have been caught doing mass cheating in their final exams. They were caught, because a whole range of pupils had achieved suspiciously extraordinary results in a broad range of subjects, which were contrary to their usual achievements and which they were only able to do so, because they already knew what their exams would look like. As was found out later, one pupil (who supposedly was not that from that particular school) had photographed the exam sheets with his mobile camera phone and sent the pictures via MMS around. After that, they were again sent around via e-mail. Another example are videos that were made with mobile phones and which could be found on ‘YouTube’ later on. The circulation of a video of a “disgusting cultural product” by Vietnamese students had been reported lately. They had uploaded a video which shows the today 20-year-old actress Hoang Thuy Linh during intercourse with her boyfriend who made the video by himself and saved it on his laptop. He lent the computer to a friend, who again copied the video and sent it to numerous friends. Shortly after that the clip could be watched on video-websites and had been downloaded by a copious amount of users – and as a consequence the TV series where she acted was called off.

Media usage and effects have been and are still researched with regards to single media. The examples however show that it does not suffice (any more) to focus on just on medium during research. One medium blends into the next one; the usage of one is linked with the usage of the next. Such inter-medial convergence raises the issue of which medium produces which effects – which one has positive and which one negative effects. It thus also raises the issue of a *duality of intermedial usage*. This becomes virulent all the more when talking about intramedial convergence, meaning: the merging of different media into one hybrid medium. Due to the increasing mediatization of our everyday lives (Krotz 2007; Lundby 2009), it does not suffice anymore to study media in an isolated way. They moreover have to be studied in the context of the whole mediated and non-mediated communicative behaviour. (Apart from the fact that some researchers do not feel particularly flattered to being reduced to just e-mail, text message or mobile phone researchers).

<sup>2</sup> An interesting example is given by Rich Ling (2006). He is looking at the usage of the mobile phone of men and women in divorced families. He found out that while women communicate with their former spouse via SMS not at least to look for a certain communicative distance men prefer the verbal mode – and their interest goes towards forcing their female partner to follow their communicative modus by setting the medium.

## Shift of Function and Reinvention

The view on new media has often blocked out the view on older media. This, not least, led and leads to an overemphasis of the uniqueness of the new. However, it is often forgotten that the old media still remain existent and furthermore have to be viewed in a different light. This sort of theory was captured very early by the German historian Wolfgang Riepl in his 1913 published book about ancient modes of news communications. In the scientific community of German-speaking countries this theory is known as “Riepl’s Law”. He wrote that: “as a principle law of the development of news communication” emerges “that the most basic means, forms and methods, if once established and found efficient will never, not even by the absolute accomplished and most highly developed, be completely and permanently replaced and will never become obsolete but will exist parallel to them. They only might have to look for new fields and usages” (Riepl 1913: 5) Contrary to this assumption one has to take always into consideration that media can go out of the range of usage and can stop existing, at least, in their traditional form (see illustration).

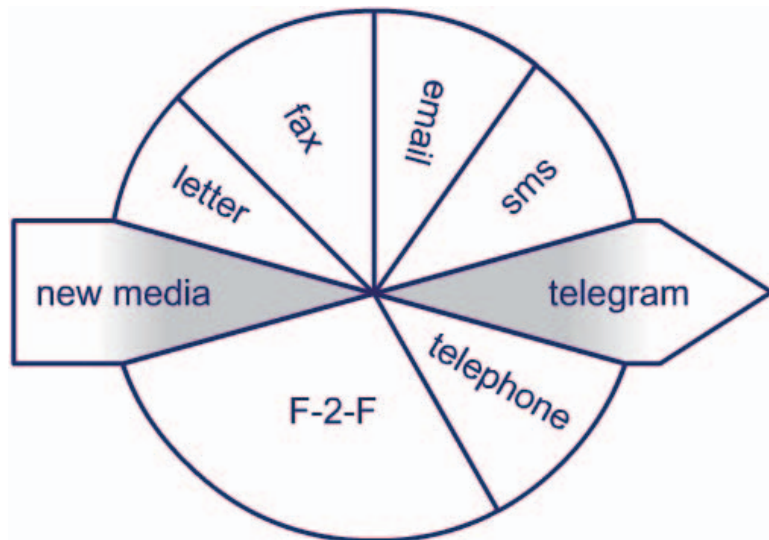


Figure 2: Media environment in transition

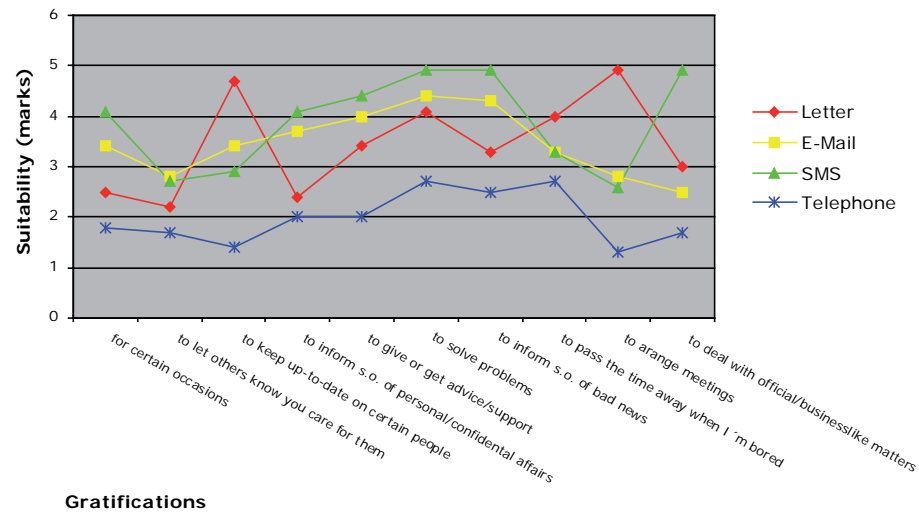
This illustrates once again that media has to be considered as a whole so that the old media or respectively the transition of the old media, alongside the (supposedly) new, does not slip out of sight. After all, the view on a single medium alone must

not hide the fact that its usage does not remain unaffected by the dynamisation of all communication processes which is again influenced by the changes of the whole media-ensemble (see Bausinger 2002: 6). Looked at it in that light one has to examine the media in the context of a media repertoire which goes with the question: “how media users actually combine old and new media, how they integrate the increasing number of options into their everyday lives” (Hasebring/Popp 2006: 370). For one, new media link to established practices. They virtually allow the realization of communicative intentions with new means. This however, that does not necessarily mean that communication itself is always exposed to serious changes. This is an experience which comes with every medium: A sequel of communication with different (albeit more effective) means. In the same way as new media link to old needs, old media are reinvented. Naturally, it is the core of any innovation that it does not enter our everyday life one-to-one, depending on the intention of its inventor. Spoken with the terminology of diffusion research one can rather speak of a continuous *reinvention* meaning that the usages of an innovation are not invariant with their introduction, but that their originally intended applications will be possibly changed by the respective user during the process of adaption and implementation. This can happen against the inventor’s original intentions of usage (cf. i.e. Rogers 1995: 174et seq.). “Adoption of an innovation is thus a process of social construction” as Rogers (1995: 179) formulates. An illustrative evidence for the above mentioned is being delivered by the telephone. The telephone in its early years was rather regarded as a medium for the transmission of music into the public ear than as a medium of interpersonal communication. Older media again obtain a new denotation by the change of their communicative function or respectively by the change of their communicative significance. Looking at the pie-chart from above again this does not only mean that new media change the size of each individual share and, of course, the relation between them, but they also change the significance of certain communicative practices in the context. A medium communicates (transports) not only contents. It is in a certain degree a significant vehicle and thus, with reference to contents, it is meta-communicatively relevant: It is definitely not insignificant which medium is used for a certain purpose – a love message via e-mail is different to a love letter. The entire meta-communicative framework for all media changes with the entry of such new media. In this light again following the duality of effects one can refer to a duality of significance in the way that every medium contains new and old elements which are never static. The following example from research might illustrate this:

The study in question was conducted between 2000 and 2003 at the German university of Erfurt and is dedicated to the significance of letters in a society coined by telematics (cf. Höfllich/Gebhardt 2005). Exemplarily, we single out one gratifica-

tion-theoretic momentum.<sup>3</sup> Media are in competition to one another and they are used because of promising gratifications. Flanagin and Metzger (2001) describe a functional image of media associations. Those, for one, base on the media related gratifications (as functional alternatives) and on the normative images of the media (which medium is used for which purpose). In doing so new media fill a gratification-gap, thus: they discharge a gratification which established media could not discharge or only after a fashion. For this reason the gratification-potential of the established media changes, of course, as does their normative image and last but not least, the association how a medium is to be used (functional image).

The diagram below illustrates this exemplarily for the letter in relation to other media (here: e-mail, text messages and telephone).



#### Gratifications

Figure 3: Media and functional images

The smaller the figure of the one to six scale the more the medium is suitable for the given purpose. Here emerges that the letter can still claim a certain significance (i.e. especially if one wants to communicate that one cares for another or if one wants to communicate confidential issues). The competition the letter faces from the telephone as a “communication substitute” can be seen clearly. Herer something like a niche exists which offeres other media (here: the telephone) an advan-

<sup>3</sup> Not at least because the uses and gratifications approach includes to look at the usage of single media in the context of an overall media environment, and it is assumed that a medium is used because it offers more gratifications than communicative/medial alternatives.

tage in the sense of the obtained gratifications. But when something personal or confidential needs to be communicated the letter is much more closer to the telephone. E-mail and text messages do not just take on tasks of the conventional letter, strictly spoken, their tasks are more associated with the telephone than with the letter. This indicates that not every form of written communication is in competition with the letter. Sometimes E-mail or even SMS may be more like a letter and sometimes they are ‘functioning’ like a telephone call.

People have a certain feeling about what media should be used for what reason – and what media should be reciprocally answered by which other media.<sup>4</sup> If one also can assume that others behave in a similar way, one can speak of a standardized usage – or in the world of Goffman (1974: 338) a “clear\*” frame“. In his words: “To say that a frame is clear ist not only to say that each participant has a workably correct view of what is going on, but also, usually, al tolerably correct view of the others’ views, which includes their views of his view.” This especially can be shown in the case of the letter. There is a distinctive norm of a (intramedial) reciprocity. A person who communicates al lot also gets a lot of communicative feedback. But such a norm of reciprocity is especially pronounced in the case of the letter: A letter has be answerde with a letter. With electronic media such a norm appears to vanish. Theories about the preferences of a certain media do not only have to consider which medium is used instead of another but they also have to consider which medium is used in association with another one. Altogether one is faced with overlapping practices as Decker (1998: 234) describes it: “Whatever one’s preferences, the concurrent existence of different orders of accessible epistolary media creates a situation in which practices overlap and interact and a choice of one medium over another is inherently meaningful. To write rather than call, to call rather than write, to write or not by e-mail are decisions made with respect to the time frame in which the message must be conveyed, the status of interpersonal relationships, rhetorical advantages and disadvantages, and many other considerations more or less complicated” (Decker 1998: 234). Not at least the study also underscores the changed significance of the letter (a change in its meta-communicative meaning) which behaves reciprocally to its usage. Since the letter has become a scarce commodity it is more precious. A letter expresses – especially in contrast to other media – a special appreciation of the addressee who is worth all the “hassle” of writing a letter. There seems to be, with other words, a strong representation of the letter and another hint that media do not vanish but indeed are changing their social meaning. Also there is a kind of “lag” – but different from the earlier mentioned: The latter still has a certain social importance although it is used rather seldom.

<sup>4</sup> See also the research of Kim et al. (2007) about the configurations of relationships in different media.



## Perspectives: Integrative concepts – frames and social representations

To sum up to this point: On their way to be part of everyday life new media evoke some eruptions in the practices of communication. To get part of this practices media are not simply 'responsible' for negative or positive effects. Instead, media are associated with a duality of effects. But it is not enough to look only at single media. Media have to be analyzed in the context of overall communicative practices – and an overall media environment. In this context old media are not excluded but, in a continuous process of reinvention, changing their functions as well as their communicative and social meaning. A duality of effects in this sense is added by a duality of significances (of the new in old media and the old in new media).

Integrative concepts are demanded which meet the requirements of a more and more complex media-scape. It is not enough to look only at the usage of media from a utilitarian point of view of uses and gratifications. Analysis has to begin

one step earlier. Before any actions media or media landscapes have to be cognitively anchored or 'represented'. Mainly, cognitive performance of individuals and their acting need to adapt to such a variety of media and at the same time they have to link old to new. Hereby media-scape comprises the entire media that is accessible to an individual. The ecological reference is clearly intended. That is to say: "The *daily* handling of media in their different contexts should be regarded as one of many forms of the social in-

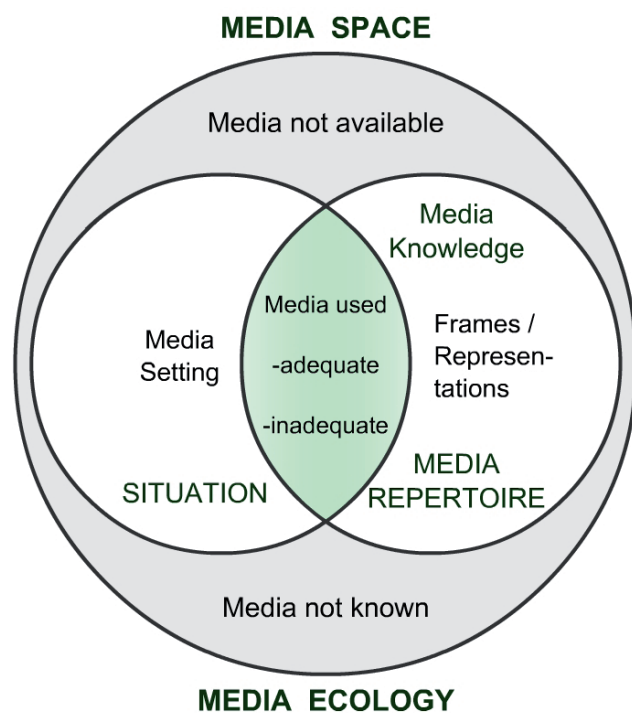


Figure 4: Media frames and representations in the context of a media ecology

teraction of individuals with their social environment. Every individual develops out of its own socialization and the direct and/or medial affecting environmental factors a personal style of interaction with its social and physical environment. Within this very environment the usage of media has a substantial partial aspect" (Kagelmann/Vitouch 1996). A mediatization of the everyday life also represents a shift in media ecology.

Media setting stands for the individual media which are disposable in an individual situation and which are used for the realization of a certain communicative intention. A media repertoire comprises all media which a single individual can "command". To put it in other words: The media repertoire unifies (partially strategic) knowledge about the situational-adequate and the strategic usage of disposable media (which media are used in which situation). Media repertoires correspond to a framework of knowledge. According to Goffman (1974: 8), frames do circumscribe "what is going on there", indicating "something that an individual actor can take into his mind – and not an organization of society" (p. 13). Goffman does not explicitly address the structure of social life. Instead he emphasizes "the structure of experience that individuals have at any moment of their social life." In this sense frames are patterns of meaning and interpretation, more or less complex metaguides to understanding, which are used by the actors to enable chains of action and interactions (Willems 1997: 351.). If there are errors in framing (a 'misframing'), "... the misperception of a fact can involve the importation of a perspective that is itself radically inapplicable, which will itself establish a set, a whole grammar of expectations, that will not work" (Goffman 1974: 309).

Although the idea of frames is based on the analysis of face-to-face interaction, frame analysis can also be widened towards mediated interaction. From such a point of view, the usage of a medium creates a distinctive *media frame*. Media frames are structured by the technological potential of the media but they are also subjectively perceived. However, media frames are social frames in the same sense that as the usage of a medium is a social affair. They are collectively constructed by ongoing interactions and therefore are subjectively anchored. A media frame – as well as the interconnection of different frames – is based on a recurrent communicative practice that constitutes a common definition of the media situation, and an emerging practice is partially structured by rules specifying forms of behaviour as adequate or false. If people decide to use a medium to contact others, there are certain expectations regarding a media-adequate social and communicative behaviour. Not at least this also means expectations regarding certain limits. By marking such limits, a media frame eventually consists of rules of adequate usage, a standardized usage (al already mentioned) and also strategies of media usage (for instance to convince, to gossip, to flirt). Research in the field of media frames has been done in the context

of different media, for instance regarding the household telephone (Höflich 2000), computer-mediated communication (Höflich 1996) or the mobile phone (Höflich 2003). Based on such an analysis media socialization means the appropriation of distinctive media frames (Höflich/Kircher 2009).

Media frames symbolize the matter in media: Which media are to be used how and when. Indeed people have not only a concept of what to do with a medium, but they also have a concept of how to use the respective medium in relation to or in competition to other media. This is the topic of the so called media-choice theories that look at the media choices and behaviour in relation to the situational affordances, normative and interpersonal influences. Seen from that perspective, individuals can choose from a number of media frames, which are all interwoven differently, as it is the case with different social frames in general. Communicative competence is shown by managing the interconnection of different frames or to change between them. This is also true in the case of different media frames. Media frames refer to the cognitive aspect of media usage and thus to the cognitive aspect of human acting in general. Also seen from this perspective, the process of mediation of the everyday life has cognitive implications. Frames are in the sense of cognitive-psychological considerations a kind of schemes or scripts, which offer orientation (cf. i.e. Neisser 1979). Scripts give the daily routines meaning – they prescribe how to act and feel in a given moment. They define situations, denote the actors and assigns the action to a plot (see Cohen/Taylor 1977: 52). This does not mean to reduce media behaviour to cognitive aspects.<sup>5</sup> But such a frame has to be presented in the mind of the actor – how otherwise could his or her behavior refer to it? (Aebli 1980: 85).

Frames as organizations of cognitions organize the social as well but are also socially constructed. In this sense one can follow Moscovici and his idea of social representations. Social representations indicate that a model of a 'lonely cognizer' that separates the person from interpersonal influences appears inadequate. Just the opposite is true: "The persons' epistemic relationship to an object is defined and mediated by his or her relevant others. The group, through its system of representations elaborated in discourse and in the service of communication, sources the individuals's understanding of, and interaction with, the world" (Wagner, Hayes 2005: 119, see also Jovchelovitch 2007)). Such representations enable to orient in a social, material (and mediated) world and enable communication by providing codes of exchange and codes of naming and classifying – they are the product of communication as well as to make communication possible. Understood as such, "social representations help us to make sense of our world and to interact within it with

other societal members" (Voelklein/Howard 2005: 434). Like frames, social representations are in a certain sense conservative. They show some resistance against change. Phases of cultural eruptions are associated with cleavages in the representational system with the consequence that new social representations emerge: "In other words, at these points of cleavage there is a lack of meaning, a point where the unfamiliar appears, and just as nature abhors a vacuum, so culture abhors an absence of meaning, setting in train some kind of representational work to familiarize the unfamiliarity as a source of social representations" (Duveen 2001: 8; see also Moscovici 2001: 37)). In the same sense Goffman (1974: 21) mentions that it is just what frames do: to make otherwise meaningless aspects of a scene to something meaningful, just like Moscovici (2001: 164) who speaks of a "framework in which all that exists or happens will have a non-problematic character. This also refers to the usage and linking of media. In this sense one can speak of media frames as social representations – or to be more exact: of the cognitive side of media frames.

Social representation theory has been used in the context of the analysis of technology in general as well as technological change (see for instance Flick 1996), but also regarding special media. Based on the theory of social representations for instance Fortunati and Contarello (2002) looked at the mobile phone. Against such a background, a better understanding, as the authors have noted, of media in relation to a "multifaceted world of communication" is provided. And this goes beyond the analysis of one single medium. When confronted with the unfamiliar or with transition such representation help as theories or fields of expertise to handle or respectively to organize reality. Initially, the new media can encounter certain continuity and can be linked with established schemes. This also explains why at the introduction of new media these media are very often linked to usage patterns of established media: The telephone is used as a new sort of telegraph and e-mails resample the patterns of letters. Medial representation and their associations are, however, not fixed. Communication is practice (Craig 2006). However, medial presentations are, yet again, changed through practicing communication or respectively through the usage of media. "And in terms of practices, there are still changes taking place" (Haddon/Vincent 2005: 238). In this way frames as social representations refer yet to another duality: the duality of frames and practice, and of continuity and transition – or as it could be characterized in accordance with Goffman: a duality of frames and framing.

Based on the idea of social representation not only change – with the process from eruption to normalisation – can be explained. Also a duality of effects can be analysed accordingly. Social representations are not only group specific – and this means that media usage based on 'media representations' differs from group to group. Also the same individuals may be guided in their reasoning by different so-

<sup>5</sup> And it would be inadequate to reduce Goffman as a cognitivist.

cial representations on different occasions (see Doise 1993: 158). Eventually, social representations enable to look not only at single media but at media and their interconnectedness. This is shown by a research of Fortunati and Manganelli (2008), where they use the social representation approach to look at the system of telecommunication with the aim to “reconstruct how these telecommunications have been metabolized in the system of social thought, and the way in which they have been seen integrated conceptually” (Fortunati/Manganelli 2008: 421). The study is based on 210 interviews where the interviewees have been asked to freely associate about telecommunications, including fax, television, telephone, computer, mobile phone, radio, video-recorder, stereo and newspaper. And indeed it could be shown, not at least with an emotional background, that media are conceptual integrated into the system of social thought. Similar it could be said that there is a social representation of the interconnection of media: how should which media or a combination of media used for what reason to get in contact with whom. Till now frame analysis and the theory of social representation still live a separate life. Taken all together combining these two may enrich the analysis of mediated interpersonal communication not at least before the background of a mediatisation of everyday life. This eventually may lead to a reconstruction of a cognitive media mad that guides mediated communication in different social contexts.

### Final remark

To analyse media not separately but in the context of an overall communicative and media behaviour integrative theoretical concepts are necessary. It is presumed that a connection of frame analysis and the social representation theory could be a fruitful way, although the relation between the two has to be further clarified – and both have certain ‘imperfections’ (see also Fisher 1997) – they seem, not at least regarding a analysis of media behaviour, to add each other. Eventually frame analysis is not so much interested in the process of constitution of a frame, social representation theory especially may help to explain a social construction of frames, based on how this social representation is based on different social groups or social networks as distinctive social worlds. This also may help to analyze the process of media diffusion and change – from the eruption caused by new media to a process of normalization. Consequently, the job of research would be to dedicate itself to such social embedded cognitive-medial organization and their transition. May this be under the auspices of cultural or social differences.

### References

- Aebli, Hans (1980): Denken: Das Ordnen des Tuns. Bd. I: Kognitive Aspekte der Handlungstheorie. Handlungen planen und ausführen, Situationen deuten, Texte verstehen, Operieren. Stuttgart: Klett-Cotta
- Bausinger, Hermann (2002): Telefon-Alltag. In: Das Archiv. Post und Telekommunikationsgeschichte, No. 3, pp. 3-19.
- Baron, Naomi S. (2008): Always on. Language in an Online and Mobile World. Oxford and New York: Oxford University Press.
- Cohen, Stanley/Taylor, Laurie (1977): Ausbruchsversuche. Identität und Widerstand in der modernen Lebenswelt. Frankfurt/M.: Suhrkamp.
- Decker, William M. (1998): Epistolary Practices. Letter writing in America before telecommunication. Chapel Hill and London: University of North Carolina Press.
- Doise, Willem (1993): Debating Social Representations. In: Breakwell, Clynis/Canter, David V. (eds.): Empirical Approaches to Social Representations. Oxford: Clarendon Press, pp. 157-170.
- Duveen, Gerard (2001): Introduction: The Power of Ideas. In: Moscovici, Serge: Social Representations. Explorations in Social Psychology. Washington Square, New York: New York University Press, pp. 1-17.
- Fisher, Kimberley (1997) ‚Locating Frames in the Discursive Universe‘ Sociological Research Online, Vol. 2, No. 3, <<http://www.socresonline.org.uk/socresonline/2/3/4.html>>
- Flick, Uwe (1996): Psychologie des technischen Alltags. Soziale Konstruktion und Repräsentation technischen Wandels in verschiedenen kulturellen Kontexten. Opladen: Westdeutscher Verlag.
- Fortunati, Leopoldina/Manganelli, Anna M. (2008): The Social Representation of Telecommunications. IN: Personal and Ubiquitous Computers, 12, pp. 421-430.
- Fortunati, Leopoldina/Contarello, Alberta (2002): Social Representation of the Mobile: An Italian Study. In: The Social and Cultural Impact/Meaning of Mobile Communication. Chunchon Conference on Mobile Communication, July 13-14, pp. 87-99.
- Flanagin Andrew J./Metzger, Miriam J. (2001): Internet use in the contemporary media environment. In: Human Communication Research, 27, No. 1, pp. 153-181.
- Gebhardt, Julian/Höflich, Joachim R./Rössler, Patrick (2008): Breaking the Silence? The Use of the Mobile Phone in a University Library. In: Hartmann, Maren/Rössler, Patrick/Höflich, Joachim R. (eds.): After the Mobile Phone? Social Changes and the Development of Mobile Communication. Berlin: Frank & Timme, pp. 203-218.
- Giddens, Anthony (1988): Die Konstitution der Gesellschaft. Frankfurt/New York
- Goffman, Erving (1974): Frame Analysis. An Essay on the Organization of Experience. New York at al.: Harper Colophone Books.
- Granet, Marcel (1980; 1963): Das chinesische Denken. Inhalt, Form, Charakter. München: Deutscher Taschenbuch Verlag.
- Haddon, Leslie/Vincent, Jane (2005): Making the Most of the Communication Repertoire. Choosing between the Mobile and Fixed-Line. In: Nyíri, Kristóf (ed.): A Sense of Place. The Global and the Local in Mobile Communication. Vienna: Passagen Verlag, pp. 231-239.
- Hasebrink, Uwe/Popp, Jutta (2006): Media repertoires as a result of selective media use. A conceptual approach to the analysis of pattern of exposure. In: Communications, 31, pp. 369-387.
- Höflich, Joachim R./Kircher, Georg (2010a): Moving and Lingering: The Mobile Phone in Public Space. In: Höflich, Joachim R. et al. (eds.): Mobile Media and the Change of Everyday Life. Berlin: Peter Lang, pp. 61-95.

Höflich, Joachim R./Kircher, Georg (2010b): Handy – Mobile Sozialisation. In: Vollbrecht, Ralf/Wegener, Claudia (Hrsg.): Handbuch Mediensozialisation. Wiesbaden: VS Verlag, pp. 278-286.

Höflich, Joachim R. (2006): Places of Life – Places of Communication. Observations of Mobile Phone Usage in Public Places. In: Höflich, Joachim R./Hartmann, Maren (eds.): Mobile Communication in Everyday Life. Ethnographic Views, Observations and Reflections. Berlin: Frank & Timme, pp. 19-51.

Höflich, Joachim R./Gebhardt, Julian (2005): Changing cultures of written communication: Letter – E-Mail – SMS. In: Harper, R./Palen, L./Taylor, A. (eds.): The inside text. Social, cultural and design perspectives on SMS. Dordrecht: Springer, pp. 9-31.

Höflich, Jochim R. (2003): Mensch, Computer und Kommunikation. Theoretische Verortungen und empirische Befunde. Frankfurt/Main: Peter Lang.

Höflich, Joachim R. (2003): Part of Two Frames. Mobile Communication and the Situational Arrangement of Communicative Behaviour. In: Nyiri, Kristóf (ed.): Mobile Democracy. Essays on Society, Self and Politics. Vienna: Passage Verlag, pp. 33-51.

Höflich, Joachim R. (2000): Die Telefonsituation als Kommunikationsrahmen. Anmerkungen zur Telefonsozialisation. In Bräunlein, Jürgen/Flessner, Bernd (Hrsg.): Der sprechende Knochen. Perspektiven von Telefonkulturen. Würzburg: Königshausen & Neumann, pp. 85-100.

Höflich, Joachim R. (1998): Computerrahmen und Kommunikation. In: Prommer, Elizabeth/Vowe, Gerhard (Hrsg.): Computervermittelte Kommunikation. Öffentlichkeit im Wandel. Konstanz: UVK, pp. 141-174.

Jovchelovitch, Sandra (2007): Knowledge in Context. Representations, Community and Culture. London and New York: Routledge.

Kagelmann, H. Jürgen/Vitouch, Peter (1996): Medien-Umwelten. In: Kruse, Lenelis/Graumann, Carl-Friedrich/Lantermann, Ernst-Dieter (eds.): Ökologische Psychologie. Ein Handbuch in Schlüsselbegriffen. Studienausgabe. Weinheim: Verlags Union, pp. 421-429.

Kime, Hyo/Kim, Gwang Jae/Park, Han Woo/Rice, Ronald E. (2007): Configurations of relationships in different media: FtF, email, instant messenger, mobile phone, and SMS. Journal of Computer-Mediated Communication, 12(4), article 3. <http://jcmc.indiana.edu/vol12/issue4/kim.html> (23.11.08)

Krotz, Friedrich (2007): Mediatisierung. Fallstudien zum Wandel von Kommunikation. Wiesbaden: VS Verlag.

Kuhn, Thomas S. (1967): Die Struktur wissenschaftlicher Revolutionen. Frankfurt/Main: Suhrkamp.

Lange, Ulrich (1989): Von der ortsgebundenen "Unmittelbarkeit" zur raum-zeitlichen "Direktheit" – Technischer und sozialer Wandel und die Zukunft der Telefonkommunikation. In: Forschungsgruppe Telefonkommunikation (Hrsg.): Telefon und Gesellschaft. Beiträge zu einer Soziologie der Telefonkommunikation. Berlin: Spiess, pp. 167-185.

Ling, Rich (2008): New tech, new ties. How mobile communication is reshaping social cohesion. Cambridge: MIT-Press.

Ling, Rich (2006): "I have a free phone so I don't bother to send SMS, I call" The Gendered Use of SMS Among Adults in Intact and Divorced Families: In: Höflich, Joachim R./Hartmann, Maren (eds.): Mobile Communication in Everyday Life. Ethnographic Views, Observations and Reflections. Berlin: Frank & Timme, pp. 145-170.

Lorente, Santiago (2006): Another Kind of 'Mobility': Mobiles in Terrorist Attacks. In: Höflich, Joachim R./Hartmann, Maren (eds.): Mobile Communication in Everyday Life: Ethnographic Views, Observations and Reflections. Berlin: Frank & Timme, pp.173-202.

Lundby, Knut (ed.)(2009): Mediatization. Concept, Change, Consequences. New York et al.: Peter Lang.

Mesthene, Emmanuel G. (1972): The role of technology in Society. In: Teich, Albert H. (ed.): Technology and Man's Future. New York: St. Martins Press, pp. 127- 151.

Moscovici, Serge (2001): Social Representations. Explorations in Social Psychology. Washington Square, New York: New York University Press.

Neisser Ulric (1979): Kognition und Wirklichkeit. Prinzipien und Implikationen der kognitiven Psychologie. Stuttgart: Klett-Cotta.

Ogburn, William R. (1964): Social Change: On Culture and Change. Chicago: University of Chicago Press

Orlikowski, Wanda J. (1990): The Duality of Technology. Rethinking the Concept of Technology in Organizations. Working Paper. Alfred P. Sloan School of Management. Massachusetts Institute of Technology, April.

Riepl, Wolfgang (1913): Das Nachrichtenwesen des Altertums. Mit besonderer Rücksicht auf die Römer. Berlin: Teubner.

Rogers, Everett M.: Diffusion of Innovations. 4th ed., New York u.a. 1995.

Voelklein, Corina/Howard, Caroline (2001): A Review of Controversies about Social Representations Theory: A British Debate. In: Culture & Psychology, 11, pp. 431-454.

Wagner, Wolfgang/Hayes, Nicky (2005): Everyday Discourse and Common Sense. The Theory of Social Representations. Houndsmill: palgrave.

Williams, Robin/Edge, David: The Social Shaping of Technology. In: Research Policy, 25, 1996, pp. 856-899.

Willems, Herbert (1997): Rahmen und Habitus. Zur theoretischen und methodischen Ansatz Erving Goffmans: Vergleiche, Aufschlüsse und Anwendungen. Frankfurt/M.: Suhrkamp.

#### Author:

Prof. Dr. Joachim R. Höflich

Lehrstuhl für Kommunikationswissenschaft

mit Schwerpunkt Medienintegration

Philosophische Fakultät

Universität Erfurt

[joachim.hoeflich@uni-erfurt.de](mailto:joachim.hoeflich@uni-erfurt.de)

## BODY TO BODY INTERACTION IN BROADBAND SOCIETY

*Jane Vincent*

### Introduction

When people communicate using information and communication technologies (ICT) they do more than simply talk into or press keys on a computational machine in response to others; they use their whole body, (physical and emotional), to achieve this communicative interaction (Contarello 2003; Fortunati 2005). In this paper I aim to explore how the concepts of electronic emotion and the e-actor may be moving us towards a new sociological theory of body to body interaction in broadband society. The concept of body to body interaction refers to interpersonal communication that involves the bodily expression via any of the senses but which is not necessarily dependent on the simultaneous or mutual use of ICT devices. Research on the impact of ICT on body to body interaction appears to be at a turning point; what is now of interest is not how a body has been physically transformed by a machine, (such as by artificial intelligence) but rather how the essence of the self has emerged from years of being exposed to using technologies of all kinds. Longo asserts that information technology stifles the natural communicative instincts of humans that are inherent in their being even before they are able to speak. He says: *We live and develop through interaction with other people, and such interaction is the more efficient and nourishing the more it is linked to the rich and complex characteristics of bodily expression.* (Longo 2003 p26)

Fortunati, closely examines the paradigm of body to body communication and contends whether it can be separated from forms of mediated communication or if they are already completely inseparable. She asserts that: *...we would have less frequent body-to-body communication without the help of communicative technologies. We have been forced to use every mode of artificial communication to make possible, keep alive, develop, or initiate our moments of "body-to-body" communication.* (Fortunati 2005 p57)

Whilst there may have been periods when ICT and machines have restricted modes of communication and bodily expression they have now become so embed-

ded in daily lives that people are finding ways to overcome these restrictions and indeed utilize the ICT to enhance bodily expression. The inherent desires to communicate in whatever ways feel right will probably sustain.

In this paper I explore body to body interaction in broadband society by firstly explaining what is meant by broadband society and then by examining the theoretical depositions that characterise this research. I examine some new concepts and theories from the work of the COST Action 298 Work Group 2 Humans as e-actors<sup>1</sup> (WG2) (Fortunati et al 2010; Gebhardt et al 2010) and this analysis is illustrated by examples from research carried out in the UK by the author and by the work of the COST 298 project team<sup>2</sup>.

## Broadband Society

*The term Broadband Society is used to characterise a society in which information has not only become the primary economic commodity, as it defines the information society, but where people's instant access to a wide variety of modes of information and communication (made up of sounds, images, texts) is becoming a common and – to a certain extent, in certain contexts – indispensable feature of their everyday lives'. (Fortunati et al 2010 p9)*

This definition appears in a newly published volume that examines participation in broadband society – the remit of the recent 'COST298' project. It is one of a number of publications facilitated by the project that delivers a diverse range of new academic research based on the ways that users of multifarious information and communication technologies (ICTs) are appropriating broadband technology (cf. Haddon et al 2005; Loos et al 2008; Gebhardt et al 2010). The broadband technology referred to in this paper is mostly that which is accessed via mobile communications through the mobile phone but for clarification as defined by the COST298 East meets West project team: *the term 'broadband' in this Action refers to an aggregate technology comprising several technical solutions (such as IPv6, xDSL, Broadband ISDN, Bluetooth, UMTS, wireless and satellite networks, DVB-T, IP datacast etc). (Sapio and Law 2010)*

Concurrent with this COST work the author, in association with her colleagues at the Digital World Research Centre (DWRC) conducted a series of research

<sup>1</sup> Members of WG2: Leopoldina Fortunati; Julian Gebhardt; Amparo Lasen; Olga Vershinskaya; Hajo Greif; Clare Lobet-Maris; Panayiota Tsatou; Andraz Petrovčič; Jane Vincent; Lilia Raycheva.

<sup>2</sup> www.cost298.org COST, the acronym for European Cooperation in the field of Scientific and Technical Research is the oldest and widest European intergovernmental network for cooperation in research. Established by Ministerial Conference in November 1971, COST is presently used by the scientific communities of 35 European countries to cooperate in common research projects supported by national funds.

projects that explored user behaviours with regard to ICTs and mobile phones in particular (see Vincent 2009 for a summary analysis of these seven projects). The research material used to illustrate the discourse in this paper draws on these various research studies starting from the seminal study carried out in 2003 (Vincent and Harper 2003) that included parallel research by the Universities of Surrey and Erfurt<sup>3</sup>. It was in this study that the notion of emotion as a particular feature of mobile phone use was first reported and these findings were used to inform the future studies that examined this topic in more detail. In addition to the author's work that explores peoples' emotion response in relation their use of mobile phones, (cf. Vincent 2003; 2005; 2006, 2009; 2010a,b) this paper also refers to the work of the Pordenone Group of Scholars who met in October 2007 to develop their discourse on the topic of emotions and ICTs (Vincent and Fortunati 2009) and to the work of WG2. The concept of emotion in relation to ICTs has a number of facets; the expression of emotions via communication such as through talking, texting and sharing and storing images is probably the most apparent, but through ICTs the expression of emotions can have multiple layers. The emotion that is lived, re-lived or discovered through machines (Vincent and Fortunati 2009), electronic emotion, discussed later in this paper is particular to ICTs. These emotions highlight how the bodily expression of, for example, love, anger or grief, can be felt without the need for co-presence with others, or even the presence of the ICT through which the emotion is conveyed. Thus there are multiple dimensions for the use of ICTs, and multiple emotion responses to the body to body interactions this ICT use generates.

## Body to body interaction and emotion

One aspect of the broadband society that facilitates instant access is the body to body interactions mediated via mobile phones and the emotion this engenders. The emphasis of this paper is on this body to body interaction and how this constant and emotionally loaded connectivity is facilitated by the appropriation of the mobile phone. This small electronic computational device has been adopted by the majority of the population, including children aged 12 and younger in most European countries. Many of these countries were early adopters of mobile phones but with ICT penetrating to all parts of the globe the communications infrastruc-

<sup>3</sup> This study was lead by the author and funded by the UMTS Organisation, Chaired at the time by Bernd Eylert. The UK research was carried out by Jane Vincent and Professor Richard Harper and the Erfurt research by Professor Joachim Höfllich and Dr Julian Gebhardt.

ture now enables contact with almost any location, albeit tempered by limitations of geographical coverage in some places (including within Europe) (ITU 2010). By the end of 2010 there are expected to be 5 billion mobile phones in use world-wide and with an increasing number of people using more than one this figure is expected to continue to rise (GSMA 2010). It is perhaps worthy of note that the aim of the mobile communications industry is to extend the use of mobile phones via a cross industry model that enables different ICT devices to connect with each other and to extend use to healthcare, transport and management of utilities (Short 2010). In their recent study that examines the use of broadband mobile communications the industry organisation the GSM Association reports they how they foresee the future development of mobile communications stating that 'Progress requires a shift from enabling standalone devices to enabling an ecosystem of connected devices' (Accenture and GSMA 2010). Mobile communications industry specifications often refer to the MMI (Man Machine Interface), such as those from the European Telecommunications Standards Institute (ETSI) who state: *'Ease of use is a key factor for the commercial success of any telecommunication product or service. The growing complexity of telecommunication services and equipment makes this aspect more and more important. Amongst other tasks, TC HF is working on the Man-Machine Interface (MMI) aspects'*. (ETSI 2010)

The interaction designer tasked with creating the mobile phone interface would argue that ease of use is not enough and that it should be creating a 'customer experience' (Jones and Marsden 2006). In this realm of human computer interaction (HCI) design the human actions are guided by and respond to the machine and the purpose for which it has been designed. It would appear that these HCI functions of the mobile phone design have now become obscured by the real nub of the users' interactions which are now body to body rather than 'man to machine'. The mobile phone device is now incorporated by its user into their bodily expression rather than the body being an adjunct to the device.

Regardless of the way one articulates the design process it is not the use of the ICT machine (or computational device) that dominates or determines the need for people to interact with each other, but rather it is the desire to be constantly aware of being in touch and connected that actually determines the interaction. This desire may be satisfied by the mere holding or thinking of the device or what it contains rather than actively using it to communicate (Lasen 2005; Vincent 2010a). It is through this process of body to body interaction that the user experiences electronic emotion. Exploring what people do, collecting data and analysing social practices is important but what of the theories and concepts that support this analysis? In the next section theory pertinent to debating electronic emotion and the role of the e-actor in electronic space is discussed after which some case studies

taken from the various research conducted by the author is explored to examine this research topic in more detail. The paper concludes by examining the findings and drawing some conclusions.

## Theoretical Perspectives

### Socio-Technological Studies and Domestication Theory

In some respects the ability to explore body to body interaction in this broadband society is possible only because of the maturation and domestication of the technologies in everyday life and the resulting symbiotic and commonplace nature of the body to body interaction that is mediated via ICT. Theoretical deposition on ICTs and mobile phones in particular continues to be the subject of debate among social scientists. Particularly influential in the examination of new media and ICTs has been the science and technology studies such as by Mackenzie and Wajcman (1998), and the work of Silverstone with others on domestication theory (Silverstone and Haddon 1996). Common to their debate and that of others (cf Rogers 1962; Oudshoorn and Pinch 2003) is the ways that users adapt and appropriate new media to accommodate personal requirements and needs. However whether or not this new media becomes an adjunct to everyday life or an integrated necessity in user's lives is the heart of the discourse about the role of the technology and how it is impacted by or impacts society and the individual. As the original proponent of domestication theory Silverstone revisited (in 2006) the concept that was originally conceived prior to the mass appropriation of individual digital technologies such as the mobile phone.

*Domestication as a process of bringing things home – machines and ideas, values and information – which always involves the crossing of boundaries: above all those between the public and the private, and between proximity and distance, is a process which also involves their constant renegotiation.* (Silverstone 2006 p233)

This 'constant renegotiation' has resulted in the transition of domestication from the intimacy of the relationship with technology occurring in the household to the intimacy of the relationship occurring between individuals and technologies in any location.

### Humans as e-Actors

The Humans as e-actors WG2 has taken this discourse a stage further to explore the holistic role of the individual user as an e-actor (Fortunati et al 2010). An e-actor – an electronic actor – is a person who is acting in electronic space, the virtual world that is the domain of ICT (Vershinskaya 2010). Fortunati explicates this point by

defining e-actors as follows: *'e-actors is a term that defines social actors viewed under the lens of their relationship with ICT... They possess a common cognitive reference framework with regard to technology, have a specific competence, share common attitudes and social practises and share common language and communication resources. They are therefore recognisable as stable social figures since they form a kind of wholeness for others and for themselves, and they share a common life world and a common social reality'*. (Fortunati 2010)

Each e-actor has a usage pattern and behaviour unique to them; this is their own e-portrait. The e-portrait can be 'painted' in numerous ways using a variety of data sources based on the e-activities the e-actor performs and which together 'give us a picture of a person showing what part of his/her life has become digital' (Vershinskaya 2010 p181). Vershinskaya discusses the implications of these new concepts of e-activity, e-actor and e-portrait with regard to the advent of an 'action oriented multi disciplinary theory'. The complexity of the component parts of the simple term e-actor begins to take shape when one considers just how much interaction this involves – as Vershinskaya makes it clear: *'computer culture is not only screen culture, such new concepts as "digital me", "e-self", "e-let" or "e-fit" imply new social phenomena which can be described with the help of e-activity research'*. (Vershinskaya 2010 p 182)

Thus from a situation in which technology is viewed as a separate entity and interaction determined or reflective of engineering and technology design we now have a situation where the mobile phone user is an actor in electronic space.

Electronic emotions are mediated via ICT using more than just language to communicate. The mobile phone is used to convey a whole body to body communication much as one might shake hands, air kiss or hug to show contact and the degree of intimacy this involves.

An example of this conjoined e-activity and bodily expression was observed by the author in a shopping mall. Two young women are seen in different locations about 300 metres apart, both are on their mobile phones. They are talking and looking around as if trying to find something then it becomes apparent as they recognise each other and wave that they have been trying to meet up and are on the phone with each other. Although they have now found each other they continue their telephone conversation laughing together as they get nearer. When they eventually meet instead of kissing or hugging the first thing they do is touch their mobile phones together and make a 'kiss kiss' sound. They laugh, turn off their phones and put them in their handbags. They walk off together arm in arm still laughing.

Far from diminishing their body to body contact by using their mobile phones these two young women have extended it beyond their physical co-presence from when they could not see each other, then to when they were in eye shot and again

once when they were together. The mobile phone has mediated the body to body contact and enabled the electronic emotion of the extra frisson of their joy at meeting with the touch of the 'phones before their physical contact.

### Always-on

A further concept that of 'always on, always connected', adds a final component to the developing theories surrounding body to body interaction in broad band society. 'Always on' has been emphasised in marketing by mobile phone network providers as is illustrated by this quote from a recent presentation by Telefonica regarding the inclusive and everyday qualities of mobile communications: *Mobile (given sufficient spectrum) has a proven track record on inclusion, as it typically is the most inclusive communications service – "always on always with us"*. (Short 2010)

The concept has also been examined in research from the user perspective by Baron in her book that examines the impact of an always on and thus always available communications technology on the development of language used in technology based communications (Baron 2008). For example a new lexicon has emerged from the enforced brevity of text messaging that has transferred to other communications media such as social networking, and perhaps this on-line always connected facility is changing how we stay in touch, but as she concludes: *'We can decide for ourselves whether to remain "always on"'*. (Baron 2008 p236)

Although the choice of leaving the mobile phone switched on should rest with its owner, the fact the mobile phone can be always on is a major factor for Turkle (she does not say if this is problem for her). However, examining the effect of having a communications technology that permanently keeps one connected, she refers to the resulting change in her behaviour that enables an all day cyber co-presence with her daughter via her mobile phone.

*The presence of the cell phone, which has a special ring if my daughter calls, keeps me on the alert all day. Wherever I am, whatever I am doing, I am psychologically tuned to the connections that matter.* (Turkle 2006 p122)

She explains that previously whilst at work at University she would not have had this extra dimension of connectivity running concurrently with her work.

This constant and always on connectivity is, for many people, now necessary always and for ever, within life and beyond life, to never be separated or alone (cf Rettie 2009; Katz 2006b; Pertierra 2008; Vincent 2010b). Furthermore, this body to body interaction mediated by the mobile phone enables people to feel together wherever they are in the world whilst not necessarily feeling the need to actually speak or make physical contact in some way. The omnipresence of the mobile phone enables an almost telepathic like quality that gives a constant and dependent presence.



## E-Actors and Inclusion

Although inclusion is a factor for industry, as the quote from Short above indicates, it would be naive to think that everyone was able to participate equally in broadband society. There is a point to note here about those who are excluded – those who are not e-actors, who are not part of this common social network and who do not inhabit electronic space, nor experience electronic emotions. The broadband society is by definition mutually exclusive of those who are not digitally connected via broadband technology, who do not have an e-portrait nor would consider themselves to be e-actors within the definition outlined above. Exclusion can be by personal choice or for other reasons such as economic, mental or physical ability, or geographical location. Already people who want to participate in broadband society are not able to do so and there is an action plan within Europe to mitigate the situation such as in the UK with the Digital Britain campaign<sup>4</sup> that aims to secure universal access to broadband. Indeed there is a growing literature on the topic of digital divide some of which is covered in the aforementioned references by members of COST298. Notwithstanding the un-sated demand for e-inclusion the notion of mediated body to body interaction for some is anathema to their personal idea of life. Why would you want to want communicate on a mobile phone (or other ICT) if you can go and see that person and talk to them face to face, or find out information by going to the location in question? The purpose of this paper is to explore the e-actors who do have some form of body to body connectivity via ICT and it may be surprising to consider that the numbers of people excluded from e-activity is perhaps fewer than might at first be thought. As we learned above an e-portrait can provide an indication of how much e-activity one might be involved with. The world of communications is by virtue of the multiplicity of ICT and interconnection technologically asymmetrical. Not owning a mobile phone does not mean that one might never communicate with another mobile phone user. Email, talk, text, multi-media messages are all inter-exchangeable via the various forms of information communications technologies; the mobile phone is one of the most versatile of these. Furthermore, simply knowing you are in a person's mobile phone directory, or your image is stored on their phone, or they call you using it, all these are a form of electronic emotion – an emotion enabled by a machine. Accordingly there will be some people with whom the e-actors can have emotional body to body interaction despite their not owning or using mobile phones or other ICT. Examples here could be between a parent and their young child whose image is stored on the mobile phone and with whom each feels connected by sharing and looking

at the image or even by just knowing it is on the phone. Another is regarding deceased friends and relatives whose text messages and personal contact details are not deleted even after they die (Vincent 2010b). In the next section I will explore the theoretical concepts outlined above and this point of asymmetrical inclusion through the discussion of three types of body to body interaction taken from previous research studies on mobile phone users in the UK.

## Case Studies

### Maintaining Always On Contact between Parents and Children

It was found in all the DWRC studies (Vincent 2009) that mobile phones were primarily used to strengthen existing relationships rather than to create new. This point has been reinforced by the significant role the mobile phone plays in the relationship between parents and their children. Acquiring a mobile phone was a rite of passage from junior to secondary school and children would often acquire their first mobile phone in year 6 when they were aged 11 in readiness for when they had to travel unaccompanied to their secondary school at the start of year 7 (Vincent 2009). When the child moved on to college and left home the mobile phone continued to be the main source of contact and reassurance between parent and child. Texting good night to a parent after a night out has the added benefit of letting them know you were safe, should a text not be received the parent can be alerted to their being a possible problem. The use of mobile phones to record images that are downloaded onto social networking sites has added to the always on contact between parents and children.

*Sally had realised her daughter's activities at university were appearing on her Facebook site more quickly than she would find out directly from her so, with her daughter's knowledge, she checks on her Facebook site what she had been doing and then texts her daughter or her friends to find out more about it. She had also downloaded and printed some photos of her daughter with her friends that she kept with her. She had a close relationship with her daughter who appeared happy to involve her mother in this way during the transition of leaving home. Sally maintained an almost constant co-presence with her daughter in this way. She saw this as a perfectly normal mother/daughter relationship and indeed implied it was strengthening the bond that was put under strain after the daughter moved away from home for the first time to go to university. (Vincent 2010b)*

As with the example of Turkle who keeps her mobile phone always-on to be contacted by her daughter should the need arise many respondents had similar experiences. Depending on the age of the child and the agreed parental responsibility roles the father and/or the mother would maintain an always on presence.

<sup>4</sup> <http://www.culture.gov.uk/images/publications/digitalbritain-finalreport-jun09.pdf>

Although for some this contact created emotional dissonance, wanting and yet not wanting to know what was happening; in most instances the always on contact was seen as positive and indeed liberating. Parents were able to enjoy holidays more as they could leave teenage children to occupy themselves in leisure activities while they pursued their own interests and shopping trips were enjoyed as family members explored their chosen stores simultaneously.

The relationship between adult children and their elderly parents was less likely to be maintained by an always on mobile phone or ICT connection. Nevertheless, most did have mobile phones, even if they only used them (and switched them on) when they wanted to make a call. The examples of electronic emotion, the emotions engendered by the use of the mobile phone were as frequent. There was much amusement about the unwillingness of some people to use a mobile phone and one respondent explained that she had carried her mobile phone fully charged with her for months but never used it, only to find out from her son that had she needed to make a call it would not have worked because her subscription had lapsed. In these instances it is not the actual use of the mobile phone that engenders the body to body interaction but the thought of it or the intended use of it.

Body to body interaction via the mobile phone for these families was thus a mostly positive experience and one that maintained an emotional bond. However, it could have the effect of generating negative electronic emotions if expected text messages did not arrive, or as with one family a shopping trip became an emotional trial after they discovered their mobile phones did not work within the shopping complex and they could not find each other.

### **Dealing with the death of family and friends**

How to manage the death of a close family member or friend is perhaps made more complex by their potentially infinite presence in ICT records. Social networking sites, email accounts and other e-activity personal to the deceased are usually managed by family, friends and business colleagues who have the task of dealing with the aftermath of the death. However, in the most recent study by the author (Vincent 2010b) some respondents explained how they dealt with their own directory entries, text messages and emails for friends who had died.

*Although he did not do so in haste as that would be disrespectful Jeremy wanted to remove contact details for fear of accidentally contacting a deceased relative whose details he had stored on his phone. In this instance his intentions were more about avoiding offence to others rather than dealing with his own feelings. However, in contrast deleting someone from the mailbox and deleting their messages was a hard decision for some and a significant part of the process of closure in the grieving of a loved one. Carl had lost a close friend and although he had managed to change his email addresses and delete old addresses on*

*the computer, even two years on, he could not bring himself to delete the phone number or his last text messages. (Vincent 2010b)*

Another respondent spoke of how he quickly deleted his mother's details from his phone but he found this hard to do as it made her death appear even more final. However it was better to remove her details than to have to deal with the unexpected jolt of her memory when scrolling through the directory in a business meeting. The fear of knowing the sight of her name could catch him out emotionally in an inappropriate moment was too much for this respondent.

In these examples the respondents showed how they chose to manage the electronic emotion engendered by the deceased friend or relative. It is clear that the emotional bond between them was still manifest as if it was a body to body interaction as long as their details remained on the 'phone. Thus although co-present body to body interaction is physically no longer possible in person it can be maintained for ever as an electronic emotion via the records and memories that are held on a mobile phone or other ICT device.

### **Managing multiple e-activities**

In the two examples above the e-actors are working within an established social network and the e-portraits of the participants are known by those involved. However, there were some respondents in the studies who used their mobile phones as business tools, most had more than one mobile phone and these were synchronised with their personal computers. Whereas families and friends are known to each other business users can have hundreds of contacts on their 'phones and although they may have met all of them at some point they probably do not know all of them. As a one respondent commented, he was not even sure if all his contacts were still in the same jobs, had the same 'phone number or were even still alive.

Nevertheless body to body interaction for these respondents was still important. Business relationships are weighted with emotion albeit of a different kind from that which relates to family and friends. Making the right impression, having the correct details, being contactable at the right time all these points have been raised by some respondents. Mike spoke of his irritation at being expected to be contactable at any time. He had worked with colleagues in different time zones and not all of them seemed to respect his normal working day.

*I think it's completely changed the way we live really, this whole 24 by7 being able to contact anybody anywhere anytime. It's changed the way we do things; you don't have to be organised in the same way, you can do things differently, you don't have to rely on phone boxes working to get home and you just get used to being able to contact people anywhere anytime and that's a big change – I'm not necessarily convinced it's a good change, it's just part of the overall speeding up of the pace of life [Mike]. (Vincent 2010b)*

To some extent this is a negative response to the always on concept however, for Mike the problem is caused by the multiple e-activities he is involved with via his work colleagues. Advances in mobile communications technology, most particularly smart phones and their synchronisation with diary, email and contacts has simplified the multiple e-activities for these respondents. However, body to body interaction via their mobile phone or other ICT is a vital component of their ability to do their job effectively and could not be wholly substituted with actual face to face interaction instead.

## Conclusion

The theories and concepts discussed in this paper arise out of the body to body interaction between e-actors that is mediated via information and communication technologies. The use of these ICTs, and the mobile phone in particular, have become so commonplace that they have become taken for granted as part of the body to body interaction process in broadband society. The language used, the senses triggered are a natural process in everyday life, a process that is transcended by the noticeable all consuming desire for constant connectivity. The constant touch, being in touch, being always on, does not have to be physically felt but merely achieve a state of the awareness with chosen others that is tantamount to actual or tangible body to body interaction. Maldonado in his discourse on the body in which he explores the impact of technology asserts, *One very important point is usually overlooked: A person's natural sense of touch does not consist only of contact; touching is not just touching. Our sense of touch perceives multiple factors even without true direct contact with our skin. (Maldonado 2003 p20)*

This ethereal touch, manifest in electronic emotions and mediated via the mobile phone (or other ICT), provides the electronic substitution for the real life physical body to body interaction. It is particularly poignant when it is used as a substitute for the co-presence of deceased loved ones but equally moving when it is used to sustain and strengthen existing relationships. It is also notable that the different e-portraits result in asymmetrical body to body interaction with some e-actors being more involved than others.

There are several theoretical perspectives discussed in this paper and the suggestion was made in the introduction that the concepts of electronic emotion and the e-actor may be moving us towards a new sociological theory of body to body interaction in broadband society. Writing in 2005 Fortunati noted in her analysis of body to body communication that it 'intermingles profoundly with forms of mediated communication to the point that it becomes difficult to tell them apart'

(Fortunati 2005 p53). Five years on and this continues to be true and indeed the transition to a symbiosis of body to body interaction and mediated communication would appear to be complete for at least some of the respondents discussed in this paper. The augmentation of Fortunati and Contarello's work on body to body communication by the WG2 work on Humans as e-actors does suggest a new form of body to body interaction has emerged from broadband society but more analysis is required to understand whether this is still in transition. It is clear, however, that the electronic emotions can only be felt via a body to body interaction between e-actors that is mediated via the mobile phone or other ICTs.

This paper also introduced some ideas concerning e-inclusion and how the design of future ICTs might deliver more than simply the old fashioned prescriptive 'man machine interface'. Designing to a customer experience is one approach but given the asymmetry of communications and the wide choice of ICTs and interfaces it would appear that 'one size does not fit all' and multiple customer experiences exist for each of the (circa) 5 billion customers. The opportunities for future design may well lie in developing an understanding of people's e-portraits and in finding ways to facilitate the electronic emotions that these entail. Successful body to body interaction in broadband society is achieved by keeping people emotionally connected always. An attractively designed ICT device with an apparently perfect interface, such as a particular model of mobile phone, will always come second to this emotion goal. It is as if the mechanism used to mediate the body to body interaction in broadband society is now the slave of the e-actor and the success of the body to body interaction it enables is measured by the electronic emotion it elicits and much less by the look or feel of the device.

## References

- Baron N., (2008) *Always on; Language in an online and mobile world* Oxford University Press New York
- Contarello A., (2003) *Body to Body: Co-presence in Communications* in Fortunati L., Katz J., Riccini R., Mediating the Human body: Technology, Communication, and Fashion pp123-132 Erlbaum: Mahwah
- European Telecommunications Standards Institute, ETSI <http://portal.etsi.org/HF/hta/MMI/mmi.asp> accessed 13 April 2010
- Fortunati L., (2005) *Is Body-to-Body Communication Still the Prototype?* In *The Information Society* 21 pp53-61
- Fortunati L., From ICT User to Broadband e-Actor in Fortunati L., Gebhardt J., Vincent J., Petrovčič A., Vershinskaya O., (2010) eds. *Interacting with Broadband Society* Peter Lang Berlin
- Fortunati L., Gebhardt J., Vincent J., Petrovčič A., Vershinskaya O., (2010) eds. *Interacting with Broadband Society* Peter Lang Berlin

- Gebhardt J., Greif H., Raycheva L., Lobet-Maris C., Lasen A., (2010) eds. *Experiencing Broadband Society* Peter Lang Berlin
- Haddon L., Mante-Meijer E., Sapio B., Kommonen K., Fortunati L., Kant A., (2005) eds. *Everyday Innovators, Researching the Role of Users in Shaping ICTs* Springer
- ITU International Telecommunications Union (2010) *Information Society Statistical Profiles 2009 Europe v1.01*, ITU Geneva
- Katz J., (2006a) Mobile Communication and the Transformation of Daily Life: The Next *Phase of Research* in Mobiles Knowledge Technology and Policy 19:1 pp 63-71
- Katz J., (2006b) *Magic in the Air Mobile Communications and the Transformation of Social Life* Transaction New Brunswick
- Jones M., Marsden G., (2006) *Mobile Interaction Design* Wiley Chichester
- Lasen A., (2005) *Understanding Mobile Phone Users and Usage* Vodafone Group R&D Newbury
- Loos E., Haddon L., Mante-Meijer E., eds. (2008) *The Social Dynamics of Information and Communication Technology* Ashgate: Aldershot
- Mackenzie D., Wajcman J., (1998) *The Social Shaping of Technology* (2<sup>nd</sup> edition) Open University Press Buckingham
- Maldonado T., (2003) *The Body: Artificialization and Transparency* in Fortunati L., Katz J., Riccini R., Mediating the Human body: Technology, Communication, and Fashion pp 15 – 22 Erlbaum: Mahwah
- GSM Association <<http://www.gsmworld.com>> accessed 6 April 2010
- Accenture., GSMAssociation., (2010) Realising the Embedded Mobile Opportunity Together GSMA <<http://www.gsmworld.com>> accessed 6 April 2010
- Oudshoorn N.E.J., Pinch T., (2003) *How Users Matter: the Co-Construction of Technologies and Users* MIT Press: Cambridge
- Pertierra R., (2008) The New Media And Heterotopic Technologies In The Philippines in *Human Technology* Volume 4(2), 169–185
- Rettie R., (2009) Mobile Phone Communication: Extending Goffman to Mediated Interaction in *Sociology* 43:3 pp 421-438
- Rogers E. M., (1962) *Diffusion of Innovations* The Free Press New York
- Sapio B., Law P., (2010) East meets West: Dialogue between Broadband Societies COST298 [www.cost298.org](http://www.cost298.org)
- Short M., High Capacity Broadband Everywhere – the Potential of Mobile Connectivity – European Internet Foundation – 23/03/2010 European Parliament
- Silverstone R., Haddon L., (1996) Design and the Domestication of Everyday Life in Mansell R., Silverstone R., eds. *Communication by Design* Oxford University Press New York
- Turkle S., (2008) *Always on/Always-on-you: The Tethered Self* in Handbook of Mobile Communications Studies ed. Katz J E., MIT Press Cambridge Mass.
- Vershinskaya O., (2010) Theoretical Approach to the Concept of Humans as e-Actors in Fortunati L., Gebhardt J., Vincent J., Petrovčić A., Vershinskaya O., (2010) eds. *Interacting with Broadband Society* Peter Lang Berlin
- Vincent J., (2003) Emotion and Mobile Phones in Nyiri K., (ed.) *Communications in the 21<sup>st</sup> Century: Mobile Democracy Essays on Society, Self and Politics*, PassagenVerlag Vienna,

- Vincent J., (2005) Emotional Attachment to Mobile Phones an Extraordinary Relationship in Hamill L., Lasen A., (eds.) *Mobile World, Past Present and Future* Springer London pp 95-104
- Vincent J., (2006) *Emotional Attachment and Mobile Phones* Knowledge, Technology and Policy Vol 19:1 Springer Transaction
- Vincent J., (2009) Emotion, My Mobile, My Identity in Vincent J., Fortunati L., (2009) eds. *Electronic Emotion. The mediation of emotion via information and communications technologies*. Peter Lang Oxford
- Vincent J., (2010a) Me and My Mobile in Fortunati L., Gebhardt J., Vincent J., Petrovčić A., Vershinskaya O., (2010) eds. *Interacting with Broadband Society* Peter Lang Berlin
- Vincent J., (2010b) Living with Mobile Phones in Hoflich J., Kircher G., Linke C., Shlote I., eds. *Mobile Media and the Change of Everyday Life* Peter Lang Berling
- Vincent J., Fortunati L., (2009) eds. *Electronic Emotion. The mediation of emotion via information and communications technologies*. Peter Lang Oxford
- Vincent J., Harper R., (2003) The Social Shaping of UMTS – Preparing the 3G Customer, Report 26 for UMTS Forum 2003, <http://www.unts-forum.org>

**Author:**

Jane Vincent

Visiting Fellow

Digital World Research Centre

Faculty of Arts and Human Sciences

University of Surrey, Guildford, UK

[www.dwrc.surrey.ac.uk](http://www.dwrc.surrey.ac.uk)[jane.vincent@surrey.ac.uk](mailto:jane.vincent@surrey.ac.uk)

## MEDIA & COMMUNICATION STUDIES – HOW THEY (CAN) INFORM DESIGN

*Julian Gebhardt*

### Media & Communication Studies



2

#### **Content:**

1. Introduction
2. Trends & Developments
3. Major Challenges
4. Conclusion
5. Discussion

### 1. Introduction



3

#### **Definitions:**

- Media- and Communication Studies
- Human-Computer-Interaction
- ICT Design

# 1. Introduction



4

## Media & Communication Studies:

Media and Communication Studies are dealing with the social pre-conditions, meanings and consequences of human communication in mediated, public and private contexts (DGPUK 2010), e.g.:

- Media and Communication Theory,
- Media History and Evolution of Media,
- Mass Communication and Journalism,
- (Mediated) Interpersonal Communication,
- Ethics of Media and Communication, etc.

# 1. Introduction



5

## Human-Computer-Interaction (HCI):

Human-Computer Interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use (ACM 2009), e.g.:

- **Personal Computing**, e.g. word processing, databases,
- **Social Computing**, e.g. email, blogs, wikis, instant messaging,
- **Mobile Computing**, e.g. laptops, tablets, smart phones,
- **User Interfaces**, e.g. graphical, tangible, natural-language,
- **Robotics**, e.g. aibo, asimo, furby,
- **Gaming, Audio, Video**, e.g. xbox, ipod, zune, etc.

# 1. Introduction



6

## ICT Design:

ICT Design is the process of originating and developing a plan for making ICT devices, structures, systems and services applicable, i.e. engineering, modelling, packaging, marketing, evaluating – both aesthetical and functional (Dix et al. 2003), e.g.:

- Human-Centred Design,
- Participatory Design,
- Universal Design,
- Contextual Design, etc.

# 1. Introduction



7

## HCI – An interdisciplinary endeavour:

ICT Designers have well understood that designing profitable ICT devices and service requires a lot of expertise in many fields (Sharp et al. 2007), e.g.

- **Computer Scientists**: Software- and Hardware Architectures,
- **Designers**: User Interfaces, Surface Designs, Web Designers,
- **Social Scientists**: Social Structures, Contexts, Norms, Habits,
- **Psychologists**: Information Processing, Recognition, Emotions,
- **Linguists**: Speech Patterns, Semiotics, Conversational Rules,

# 1. Introduction



8

## Media- and Communication Studies:

Media and Communication Scientists didn't play that much of a role so far in designing and shaping the future. This, however, might change (TMC 2009).

### Why?

Because they have a (quite) long tradition and expertise in understanding those media environments, markets and people ICT companies are dealing with today:

- mass communication and journalism,
- media and social networks,
- media formats and contents,
- audience activities, needs, wishes, etc.

# 2. Trends & Developments



9

## Some major developments (Horizon 2010):

- ICT Companies are trying to enter new media markets either in accordance with or against the interests of traditional content providers and media companies (e.g. Apple and NYT).
- ICT and Media Companies are trying to merge their traditional products and services to turn them into something new, e.g. IP TV and Social Web Technologies (e.g. CNN and Facebook).
- More and more ICT developers are becoming part of the media business with regards to Hard- and Software, Content, Control of Payment, Marketing, and Distribution.

# 2. Trends & Developments



10

## Apple TV:

Since 2008 Apple TV offers basic media services with movie previews and videos provided by YouTube, Flickr, CNN, MTV and others.

- How much flexibility and openness do people want, accept, refuse?
- Which contents do people expect from „closed“ TV systems in comparison to „open“ digital TV services?
- What makes people change their (old) viewing, recording and selection habits and routines?

# 2. Trends & Developments



11

## Apple's iTunes Store:

Opened in 2003 it is now the number-one music vendor in the US. Content is delivered by major record labels (e.g. EMI, Universal, Warner, and Sony Music) and film companies (e.g. 20th Century Fox, Walt Disney Pictures, and Paramount Pictures).

- What do customers expect from such online stores in terms of content, formats, editing, sharing, etc.?
- How can user habits, like playing, mixing, and recording music and video be changed (interoperability)?
- What does the music and film industry expect in terms of digital rights managements and censorship?

## 2. Trends & Developments



12

### Apple's iPad:

The iPad is a tablet computer for Internet browsing, media consumption, gaming, and light content creation. A lot of media companies have begun to design special iPad subscriptions and contents, e.g. New York Times, Vanity Fair, CNN, and Wired Magazine.

- To what extent can user habits be confronted and changed in terms of forcing content to them vs. letting them search and find whatever they want.
- How can the wishes, needs and expectations of Apple's co-operation partners be addressed, e.g. with regard to video streaming, censorship and formats?

## 2. Trends & Developments



13

### Wrap-Up:

- ICT industry is entering more and more media markets and platforms which traditionally have been occupied and fertilized by publishers, media companies and services
- Traditional media experiences, e.g. watching television are turning into something new, e.g. watch live TV online, and chat with friends in the same system.
- Merging roles of journalist, technologists, and designers, meaning that everyone in the business is facing new tasks, needs and challenges which need to be addressed.

## 3. Challenges



14

### Merging markets, media and communications

- What are the underlying motivations and interactions that make the merging of social network tools, next-generation web services and broadcast media more effective and useful?
- What needs and problems do ICT stakeholders have concerning content, media formats, and delivering, e.g. journalists, providers, designers, retail stores, users?

## 3. Challenges



15

### Merging markets, media and communications

- What do people want, care about and expect with regard to new and different media formats, contents but also to such things as privacy?
- How to give digital media consumers more flexibility in getting what they want and need in comparison to traditional broadcasting models?
- What are consumers' demand for accessing different types of information (e.g. news) with regard to activity feeds, micro blogging, live streaming, and real-time analytics.



### 3. Challenges



16

#### The Knowledge Gap (PEW 2010):

ICT Developers are facing new markets, partners, users, habits, and challenges. This means that taken for granted assumptions in design have become fragile and confronted, e.g.

- How to understand new (digital) Media markets and consumers?
- How to understand new (digital) Communication Contexts and Media Environments?
- How to understand the needs of journalists, publishers and gatekeepers?
- How to understand ICT users in their roles as recipients, publishers, audiences, information managers?

### 4. Conclusions



17

#### Media and Communication Studies:

Media and Communication Studies can help designers to better understand the new media landscapes, markets and users they are designing for.

So just feel free to invite them to your labs and agencies, tell them your problems and listen what they have to say.

### 5. Discussion



19



### Literature



20

ACM Association for Computing Machinery (2009): Definition of HCI (Online Document: [http://old.sigchi.org/cdq/cdq2.html#2\\_1](http://old.sigchi.org/cdq/cdq2.html#2_1)).

DGPuK –Deutsche Gesellschaft für Publizistik und Kommunikationswissenschaft (2010): Selbstverständnispapier. (Online Document: [www.dgpuk.de](http://www.dgpuk.de)).

Dix, Alan et al. (2003): Human Computer Interaction. Prentice Hall.

Horizon (2010): The 2010 Horizon Report. Edited by Johnson, L. et al. The New Medium Consortium.

PEW – Pew Research Center's Internet & American Life Project (2010): The Future of the Internet. Elon University, Washington.

Sharp, Helen et al. (2007): Interaction Design: Beyond Human-Computer Interaction. John Wiley & Sons.

TMC – The Media Consortium (2009): The Big Thaw – Charting a New Future for Journalism. (Online Document: [www.themediaconsortium.org](http://www.themediaconsortium.org)).

**Author:**

Dr. Julian Gebhardt

University of Potsdam/Hasso-Plattner-Institut, Germany

julian.gebhardt@uni-erfurt.de

**COMBINED IMAGINATIONS****THE WORKINGS OF SOCIOLOGY AND COMPUTER SCIENCE IN COMMUNICATIONS TECHNOLOGIES RESEARCH LABORATORIES***Richard H. R. Harper***Preamble**

In 1904, Edouard Estaunie coined the term *telecommunication* by merging the Latin word *communico* (impart or share) with the Greek word *tele* (distance). He had in mind a word for any technology that used electronic signals to exchange information. We still use the term in pretty much the same way one hundred years later, although in a more encompassing fashion. The historian of telecommunication, Anton Huurdeman (2003), uses it as a label for any “technology of information transport.” Paper mail and motorcycle couriers would presumably fit into this category. We no longer think of *telecommunication*, however, as the word for our communications-obsessed times. Instead, the words *computer* and *Internet* have become synonyms for the all human desire to be in touch with others. Here I am thinking of not the evolution of words but simply the use of everyday phrases like “Are you on the Internet?” and “I am much better at keeping in touch with a PC.” These phrases convey that some thing (a PC, a mobile phone, the Internet) is like an umbilical cord linking each of us in principle – an umbilical cord between ourselves, our friends, and the world at large.

In this paper, I try to define the kinds of human vision (that of the user who desires to be in touch) that underscore the inventive landscape that I see around me. Key to this vision has been the idea that more is better and that we should keep our inventive imagination to the grindstone to produce more ways of being in touch. This approach has produced a landscape in which we talk about being in touch via computers as if it were commonplace and also expect that this landscape will keep changing as new tools for richer, more, and hence better communication appear. I don’t ask whether we need more communications channels, but investigate why we keep inventing them. My underlying claim is this inventiveness is driven by an idea about what is human. In this respect, my explorations will be of the sociological in technical research, though as we shall see, it is also an investigation of the fate of sociologists and computer scientists when they work together.

For twenty years, I have worked in places that have been concerned with inventing the technologies that are of interest to us now. At first glance, this world might not seem to have been driving the communications landscape around us. I currently work at Microsoft Research and have also worked at Xerox PARC's European lab, EuroPARC. One might imagine that the research carried out in these places was about work life and not about being in touch in private life. But in practice, these landscapes were being constructed by people with a passion for computer-mediated communication. This passion has been bound up with the emergence of the Web and the protocols that allow data traffic to move around the world at enormous speed and in huge volumes.

In this paper, I characterize a model of the interacting human that my colleagues and I had in mind when we invented in these workplaces. This model has two elements. The first emphasizes the bodily aspects of communication, and hence treats physical distance as the problem that technologies of communication solve. This view generates lots of interesting ideas as well as new technologies for communication, many of which we see around us now. But this vision of the human also misses out important aspects of the *communication act*. Consider, though letter writing might have started as a way of solving the problems of physical separation, once cultivated, letter writing has an altogether different affect on those involved, for example. It doesn't bring them together in a physical sense, but in a moral one, creating a new sensibility for human bonds, bonds mediated in this case by pen, ink and the transporting envelope. The vision I describe that emphasizes the bringing together of bodies ignores these properties of the communications act.

The second element of the view I am interested in emphasizes the processing limits of the human. This treats the human not just as a body located in space (and hence separated from other bodies through space), but as a machine that processes information, including acts of communication. Words are one of the substances that this processing machine deals with. In this view, there are objective thresholds beyond which people can no longer process information. If the body-emphasizing view has predominated in the past, this processing view is now central to what motivates much of the research that is being conducted today on *communications overload*. This research looks at such things as how to tame interruption and communication excess. If human communication is merely a form of attention giving, then attention thresholds can be used to determine what to invent for people so that they don't communicate too much.

I am not sure that this is the best way of thinking about human communication, although as with the body-emphasizing view, it provides something to work on for those who are in the inventing business. This view of the human may be appealing for pragmatic purposes, but it takes the expressiveness out of communi-

cation and recasts communication as a measure of volume. One problem that my colleagues and I deal with is the shift between our professionally pragmatic notions that there are such limits (that human expression is a measurable entity that has a volume) and our ordinary, commonsense notions (that human expression is rich in meaning and inflection and that quantity is only occasionally the appropriate measure to apply when seeking to describe, account for, or assess the expressions in question). When deploying common sense, everyday reasoning, we might use the word *quantity* when we are thinking of moral overtones ("You said too much," for example), whereas in our professional lives, we use the word *quantity* when we are thinking of what a body can process – what our ears can hear and our eyes can see. These are not the same.

## Interacting Individuals

Some twenty years ago, my colleagues and I were toying with two or three systems that let us undertake certain kinds of communication acts, and today I still see colleagues playing with variants of some of these concepts and inventions. What motivated us then had to do with a mix of hopes and expectations. But beyond this, we were motivated by notions of what a human is, what an interacting human does, and what our inventiveness ought to enable. We are entranced by the same view today.

In the early 1990s, I was fortunate enough to work at Xerox EuroPARC in Cambridge. For many reasons, EuroPARC was a curious place to work, and one was the predilection of many of its staff for video-mediated communication (VMC). Because of this, the entire EuroPARC building was wired for sight and sound. Nearly every office had a coaxial cable that linked it to every other office and that conveyed high-quality audio-video connections between offices. These cables and connections could create what was called a *media space* between any two or more offices (see William Gaver and colleagues, "Realizing a video environment", 1992). Part of the fun of working at EuroPARC was the shock and glee that was provoked by the media space. Some journalists were appalled and called it Big Brotherish. Others were enamored at how the media space pointed toward the prospect of bringing together people who were separated by great distances.

Many projects investigated the utility of the set of systems that comprised the computational infrastructure of EuroPARC's media space. Looking back, a couple of these systems are notable. Shared editors – what were most often called *shared whiteboards* – allowed people in different offices to type text into a document at the same time as someone else was typing in another office. One of us would type text

into a window on a screen (the *editor window* of the application), and our colleagues in another room saw this being typed into their view on the editor window and could type on the next line of that window. This would be visible to the person who created the first line. The system did not indicate who wrote what. But typically, one could tell simply by the turn taking: one person wrote, a second wrote, the first replied, and so on. That was the gist of it.

These editors were being investigated for their use in what was called *knowledge work*. Knowledge work might be a vague term, but we were interested in supporting it, especially when the participants were separated by distance, because new organizational structures were increasing the likelihood that such work would be undertaken by individuals spread around the world. As organizations became increasingly global, knowledge work was being done in New York, London, and New Delhi, and technologies were required that could support such distributed activities. It was thought that the distance between the individual offices in our building could be treated, analytically, as proxies for bigger ones in the real world.

Nothing much came of the shared whiteboards, whatever the merits of investigating knowledge work. We did not manage to implement them in any effective way in real work outside of our lab, nor did we use them much for our work. Although these tools were central to what our managers stated was our research goal (or topic) we did not find them hugely useful for our own activities, our own knowledge work, nor did we find them particularly interesting. They seemed too prosaic to be worth investigating, although some visiting researchers found interesting aspects to them, which they published in the groupware and computer-supported collaborative work (CSCW) literature. Our managers remained vaguely hopeful that we might evolve these shared whiteboards in novel ways, bringing a Xerox sheen to what was a fairly crude technology. But we did not. Other technologies, especially the audiovisual aspects of the media space, enticed us away from the whiteboards.

Nevertheless, we used these shared whiteboards for ourselves – not for knowledge work (to help us write reports or share profound ideas) but for play. They became devices for laughter and mischief, and using them could be fun. We used them for jocular asides about the burden of deadlines, and occasionally to make plans about after-work activities. At least one romance at EuroPARC flourished with this form of exchange. What we were playing with then was the genesis (in a convoluted and indirect way) of what is now known as *instant messaging*. Although our managers thought that these tools would be used by professionals in their knowledge practices and my research colleagues and I assumed that these tools would be work-orientated applications, some twenty years later one can see that they have been crafted into tools for sociality. These knowledge work technologies have ended up allowing, for example, teenagers to keep in touch with each other. Instant messaging is a

way of communicating not for work's sake but for friendship's sake. Tools for serious things like work have ended up being used as tools for other things, for friendship and for play in social life (see Harper, 'From teenage life to Victorian morals and back' 2005 and Harper and Hamill, 'Kids will be kids: The role of mobiles in teenage life', 2005).

It now seems perplexing that we believed that these applications were to be thought of only in terms of work. As I say we did not use them to support our own activities even though we were professionals doing knowledge work of a kind. We found fun and utility in them through their playfulness and in supporting not professional engagement but our social selves. We were doing then pretty much what teenagers do now – indulging in what the French sociologist Michel Maffesoli suggests, metaphorically, in his *The Time of the Tribes: The Decline of Individualism in Mass Society* (1996) is a contemporary form of Dionysian tribalism. He has in mind the desire of our “modern selves” to celebrate the temporary, daily, bodily togetherness of work and social tribes, whichever tribe that might be – research lab tribes included. I think there is certainly something in this metaphor.

Be that as it may, there is a bigger question that is brought to mind by this. The fate of this technology can lead one to ask whether there is something peculiar in the relationship between those who do the inventing and those for whom the inventing is said to be done. Are inventors justifying their ideas on the grounds that someone (perhaps not themselves) will use their inventions, and are these ordinary people in the real world something of an artificial construct? One might say that one of the ways that we work in my world is by making users “other” in various ways and that, for us, this otherness was (and continues to be) simply other than ourselves.

Over the years, I have heard my colleagues justify some ideas with the assertion that real people will use them, even if the colleagues in question (the inventors of the thing) don't say who these people might be. We all can drift into fatigue or laziness and might not really have in mind a particular real-world user. Sometimes, phrases like *ordinary people*, *real people*, and *people in the real world* get used to justify technologies that my colleagues and I haven't really figured out the purposes of for ourselves. We think we have devised something that is of use, but for what and for whom are beyond our comprehension. Ordinary people have lots of faces and lots of desires, and so we use this label as an expression of hope that some one, somewhere, for some reason or other will indeed like our contraptions.

In some instances, we don't have a clue about who might use our inventions, but this is not common. My colleagues and I are pretty thorough in our research and most often have a user in mind, but it might not be a view of the user that is held outside my kind of workplace. This view might not always be well articulated, but

nevertheless it is held by most of my colleagues. They held it then, and they hold it now. The example of shared editors hints at what this view is. My description of another technological experience that we shared at the EuroPARC media space will explain a great deal about what kind of user we had in mind and how this vision motivates us today.

## Ways of Looking in My World

While we were using these shared editors, another project was adding some refinements to the media space, especially to its audio-video conferencing capabilities. When I first arrived at EuroPARC, the media-space system was fairly simple. Each office had a high-quality camera that was mounted on a wall or tripod or attached to shelves and that allowed others who used the media space to see you. Speakers were fitted in the room wherever space could be found, and a monitor allowed a user to see the other office when a connection was made. All these were separate from the workstations that we were using, although we used the workstation to initiate a connection. This arrangement meant that these devices usually were separated from one another. If one looked into the camera, then one might well be looking away from the monitor on which one could see a colleague. The same would hold true for colleagues. So when one made a connection to another person's computer, one would look at this person on one's own monitor, but the other person would appear to be looking elsewhere – not at you. They too were looking at their monitor, wondering why we were looking away. In both cases, the camera would be far enough away from the monitor for this *incongruency of perspective* (as my colleagues expressed it) to occur. Some of us found this vexing or amusing. “Look at me when I am talking!” someone would shout. “I am!” someone else would reply. Some of my colleagues, however, were convinced that this problem needed fixing. They devised solutions – inventions of sorts – that solved the problem. These solutions were not difficult. Somehow the cameras needed to look at the subjects as if the cameras were looking from the same point of view as the monitor. Both the looking and the glancing needed to be the same.

In the early 1990s, the only way to achieve this fix was to assemble and box up mirrors (like a periscope) around the monitors so that the line of sight of the camera appeared to be hidden within the monitor. This improvement to the system was called *video tunnels*. Various experiments were undertaken to investigate whether users (us) felt at ease with the system. One particular concern was whether users could better understand what others in the system were seeing. This system allowed us to know that when a colleague looked away, he wasn't looking at our own picture,

for example, but instead might have an object (a document, say) that he wanted us to view. There might be a *mutual referent*, as it was grandly put. Efforts were made to write up these findings for publication, but these faltered; and within weeks after the experiments were completed, the system was packed up. The periscope-type boxing was large and unsightly, and no one seemed to think that video tunnels made a significant improvement. The media space returned to its former state.

I certainly found it easier to use a system when the eyes of a fellow participant seemed to be looking at me. But much of my own enjoyment with the media space had nothing to do with the ability to look into another's eyes as he or she gazed into my own. It was fun merely to peer into another room to see what was happening there. Sometimes we would use the media space to call out to each other between rooms separated by several floors and see if anyone was around. This was especially so between reception (the ground floor) and the administrative offices (the top floors). This play did seem to be a kind of Dionysian tribalism, as Maffesoli would have it – all the more so as I look back now and wonder at how much I played when I was younger.

I would like to continue to examine the view of the user that motivated this enhancement of the media space by recounting how, years later, my colleagues in another research lab in the same city are endeavoring to invent something very similar. But this time, they are devising something without the ugly boxing, the heavy camera, or the coaxial cables. We once had to make do with very large cameras, and now video cameras can be very small indeed. At that time, the best we could do was stream the video data over the network, and now we can process it and interrogate it. This makes a considerable difference to what can be assembled or invented.

In the new system that I have in mind, each monitor in the link (a link between two offices, say) has a small stereo video camera attached to its top (this is actually two cameras placed side by side). As before, the cameras look while the monitors display what is to be seen. But in the new system, data from the cameras are processed with so-called intelligent algorithms so that the system can recognize and follow the movements of those looking at the monitor. In simple terms, the cameras produce stereoscopic data that the computer can analyze to identify where the user's head is. There are various ways of doing this, such as tracking movements of the head (as a three-dimensional outline) or tracking specific points on the head (such as eyes, mouth, and tip of the nose). Irrespective of the tools (or *keys*) that the system uses, after the tracking is processed, the computer can adjust the image shown on the remote monitor to ensure that when the user is gazing at his or her own monitor, it looks as if they are gazing through the cameras at the remote viewer. The actual distance between the cameras and the screen is dissolved. The result of this system is delightful, albeit slightly odd. The remote person's eyes are

not really gazing at you; they are looking at a screen displaying a virtual you. But it affords a playful paradox: it's nice to be looked at, but after a while one tries to see how far one has to go before one cannot be looked at – to go beyond the processing of the system so that it cannot correct.

What was the goal behind these two systems? In one way, it seems obvious and perfectly reasonable. During a video conference (or videocall), it would be nice if the person you were conferencing with appeared to be looking at you rather than at something else. Both systems provided a feeling of greater politeness and social grace. The point I am making, though, has to do with the relationship between my colleagues' ideas of what to design for (ideas related to what the human actor or user of the system is) and how to deliver, through design, this sense of grace. When together or when using a conferencing system, people somehow manage to coordinate their gazes and orient their behaviors to produce for each other a sense that they are in touch, of a mind, and doing something collaboratively. There is a great deal of empirical literature on how this sense of jointness is achieved, especially in the ethnomethodological canon (see, for example, David Sudnow's 1972 book, *Studies in Social Interaction*). There is a similarly large literature reporting on the moral dimensions of looking and glancing. Researchers like Egon Bittner have explored how *not* responding to a look can be seen as social rebuff, for example, just like not answering a hello. His 1977 paper 'Must We Say What We Mean?' points out that meaning is conveyed even when we don't speak or look. Our actions embody our intentions and are thus visible for others to see. But that this is so was not what motivated these systems. What underscored them was a much simpler vision of human interaction or interacting humans that emphasized just the body mechanics of the interaction and lost sight of this moral dimension and the ways that people create a sense of joint endeavor when they communicate. This approach splits the human into a body and mind and designs only for the body while treating the mind (and all it might stand for, such as mindfulness and intentionality) at best whimsically – as something that will be satisfied indirectly, if at all.

### Fitting Touches

Why is this significant? For one reason, I am trying to get to the view of the human that motivates us, and these examples are of systems developed both some years ago and recently. These technologies are not isolated attempts to build 'solutions' that are determined by a particular view of the human. My colleagues have been developing another conference system of sorts that has a similar concept of body mechanics as the key of human communication behind it. This view is persistent

and common, in other words. The systems I have mentioned thus far have concerned themselves with the how of looking at faces, and the system I now describe concerns itself with the touching and moving of hands.

The system in question is again a video conferencing system of sorts. The concern is still to solve the problem of knowledge work over distance. This system uses a stereo camera and some clever object-recognition software to notice, for example, when hands are placed on a digital document, when they point, or even when they appear to erase a word. The inventiveness involves making such movements recognizable to the system. First, the machine must be made able to discern shapes (in this case, the shape of a hand and a finger) from other shapes and forms that the cameras might see. Second, this ability is combined with the capacity to determine movements of these things when the movement in question indicates something. Hence, a finger's movement can be seen as a gesture, for example, not a mere shadow moving over a document. The result is a system where users can get to grip their digital documents. They can move their hands over a document to mark, edit, remove, and paste words and images in the document. The movements of their hands and the gestures of their fingers are converted by the machine into the equivalents of mouse pointings and clickings. Such a technique is not devised to replace mouse pointing. Rather, it is a method that allows people to interact with documents over distance. One person points and shakes his finger over a document; a person somewhere else can see this interaction and can have the consequence of this interaction made manifest in the document they are working on. A paragraph can be highlighted or moved, and a picture repositioned. This is a hand interacting with a document that is digital and that is shared (see Shahram Izadi and colleagues, "C-Slate: Exploring Remote Collaboration on Horizontal Multi-touch Surfaces," 2007).

With this and the prior examples, one can begin to see what my colleagues have in mind about how to conceive of the user. The idea is that, whatever people want to do, they can be aided in that task by systems that replicate what one might call the *physical geography* of the interactions in question. In the first two examples, we imagined that if we were designing a communication experience for people who want to communicate to others far away, then one way of supporting that would be to invent a system that would let the people in question glance and gaze at each other when they are remote just as they might when they were together. What we needed to design for was what might be called the *interactional geography* of lookings. In the example of the more recent system, we were also concerned with remote communication but in this case in interaction and communication about documents. Here a system was invented that meant that how someone uses his or her hands when dealing with a document could be conveyed to someone remotely. Here the *geography of touch* mattered.

Calling these things geographies of touch and looking might make this vision of human needs in communication technologies seem obscure, even arcane. But my description is designed to make strange what is in fact commonplace in the world of inventing computer-mediated communications systems. Making it strange might help us think about it. What motivates a great deal of the inventiveness that I see around me is a concern with the human body, with the bodily mechanics of human interaction with computers, and with hence with communication through and with computers to other people. Inventiveness in my world is about devising ways of allowing the mechanics of the communicating individual to fit together. In this vision, what is said in communication, why something might be said, and what may be the consequences of the saying of something don't matter. The how of the saying – the manifest behavior entailed when that thing is said – is what counts.

In this vision, what is exchanged in a communication might be glancings, pointings, gestures, as well as the written or spoken word. In all cases, my colleagues and I seek ways of replicating the body mechanics of those doings – so that they are conveyed over distance and so that the mechanics (the sounds, the glancings, the pointings) may be conveyed as an assembly. The goal is to replicate the interaction of multiple, communicating bodies. Glancings need to be synchronized, listenings need to be two way, and distractions ought to be shared if they are to be oriented by another body's lookings and glancing.

## Beyond My World

Different research labs will naturally have their own preferences and ways of doing things. It could be that both EuroPARC and my current establishment have similar views. Hence both focus on the interlocking of bodies. But I now want to point out that another giant of the IT world has been producing a technology of communication that builds on a similar vision. Google has recently launched an application called Wave. Google staff explain that this offers a rich communications experience. With Wave, users can exchange words via an instant messaging type application, share documents and presentations and, if they so wish, connect via video. Wave offers multiple dimensions of being in touch.

Wave does this in a way which is similar to the application and devices mentioned above. Not technologically, but in terms of what is thought to be the essential properties of human communication that it satisfies. If the above applications allow an interlocking of glances and touches, of pointings and mutual references, then Wave also turns around a model of the communicating human, but its design highlights another feature of this vision.

Wave turns around the assumption that communication is best done when it is in *real time*. Bodies don't want to interlock with ghosts of bodies that have long since departed; fingers don't want to point at things that others won't see until some later time. The designers of Wave assume that humans want to communicate in the here and now. In this view, a written letter is a poor attempt at getting bodies together– in 'real time', in the present. Indeed, if one looks at the Google presentation of Wave on the Web (there is still no scientific research reporting on the use of the application) this is precisely what the inventors' say: letters are a technologically archaic and poor surrogate for the real human need, which is to be together, communicating without delays caused by sending signals (messages) across distance. If people could use technology that could deliver this sense of being together then they would not write letters. Letters enable only *asynchronous* expression. One person creates their communication and sends it; the other waits until it arrives and sends their reply later. Letters are an abomination of dithering in this view.

It is not only the interlocking of bodies that communication technologies should manage, then, it is also the interlocking of those bodies in specific moments of time. If Xerox and Microsoft want to bring the mechanics of communicating human bodies into a mutual assembly, then Google wants to bring them together in a way that distance does not create time delays. All communication should deliver what in contemporary parlance is called *presence* – a sense of physical togetherness in the here and now. This is what good design with digital technologies can provide.

## A Vision of the Human User

Numerous questions follow from this. Why this view? Why not another? Will bodily communicative acts ever be entirely replicated remotely? Will the problems of time delay of signals sent over distance ever completely disappear? On both counts this seems unlikely, but what difficulties arise here? The examples that I have used seem rather limited and essentially have to do with knowledge work and conferencing of various kinds. How should we view the daily assault of messages, callings, and blog postings that we are all confronted with? These don't seem like time framed body mechanics, so where have they come from? What inventive landscape produced them?

Some of these questions are certainly more important than others to our concerns. The question of where this view of the human comes from is I think the most important. It appears that my colleagues and I (as well as those in similar technology businesses) have a vision of the human (the user) and of the actions of the

human when they communicate that is not the one used in the everyday world. Ordinarily people don't think of fitting their bodies together when they communicate (or rather, sometimes they do but not often); nor do they think that being in touch is *always* about being together in real time, in the here and now. Our ordinary selves have been brought up with the idea that communication is sometimes about this, being together and sharing a place and time, but it is also an art, and when done with finesse, creates a sense of connectivity that is beyond time and space.

In other words, although sometimes my colleagues and I use the phrase *ordinary user*, we don't have in mind a comprehensive vision of people communicating; we reduce their communication acts to something very particular. Following Durham Peter's formulation in his book *Speaking into the Air* (1999) I think that my colleagues have a metaphysics – a set of ideas about what the human communicator is. In the examples above, it seems to me that important aspects of these ideas in question derive from various sources within computer science, the most influential being a founding father of the field – Alan Turing. He encouraged a view that splits the human into either body or mind and tends to disregard the latter. This might not be a precise representation of Turing himself or of the detailed claims he made in his various papers (there is no mention of mind body dualism in his work, for example), but it is a fair comment on the consequences of his view on the inventive processes that are concerned with technologies for human communication. These processes are led, in the most part, by people trained in computer science, and even if they are not trained in it, the metaphysics of this view certainly seems to predominate. If my own experience is anything to go by, then taking this Turing theoretic view is the starting point of the enquiries that have led to the communication systems I have described.

In the various papers on intelligence and the computer machine that he wrote in the 1930s, 1940s and 1950's, Turing claimed that one may understand intelligence by treating it as solely to be measured in external performance – in behavior (these discussions are encompassed in his work between the publication of his 1936 paper "On Computable Numbers, with an Application to the Entscheidungsproblem," loosely meaning the "decision problem" and end, more or less with his 1950 paper 'Computing Machinery and Intelligence'). Whether a machine or a person performs the behavior is irrelevant, he proposed. This had methodological advantages for him, as he saw it, because it offered a route around the problem of moral judgment. A person could not be relied on to describe a person's action as intelligent or otherwise for fear of upsetting the person who was being judged. Thus, in Turing's perspective, *only behavior* must count, and the source of that behavior must be hidden from view. Turing did not seem to be worried about reducing the concept of intelligence from something that is rich, complex, and subtle, that is used in di-

verse ways to achieve different sorts of understandings, purposes, and descriptive values in ordinary language and life. He preferred making the concept a mere label for a binary opposition where an action is either intelligent or not (for a review, see Piccinini 2003; see also Shanker 1998). In so doing, a particular consequence ensued. Those who adopt Turing's view assume that what goes on inside the machine itself is not only invisible but also somehow tricky and best avoided. Computer scientists ought to steer clear of the moral implications of judgment or the moral aspects of a mind's thoughts – if they are to do science as Turing conceived of it.

This hasn't meant that computer scientists subsequently haven't looked at what goes on inside the head and attempted to do a kind of science. But they have done so from the presumption that one starts with bodily behavior and then has to construct, with external evidence, ideas about what goes on inside the head. For some of those who have taken this Turing theoretic view seriously, if a computer machine can use a program in some act, some body performance (like a physical move that a player makes in a game of chess) and if this is equal to the body movement of a human, then perhaps the human mind is computer-like. In their opinion, research should be undertaken to discover the code that makes the mind work. Much of contemporary cognitive science, for example, is a product of the possibility that the human can be divided into body and mind and assumes also that the mind is a processing machine, just like a computer. It is a view commonly held elsewhere too, such as in neuroscience. David Marr, for example, argues in *Vision: A Computational Investigation into the Human Representation and Processing of Visual Information* (1983) that a computer machine ought to be able recognize a visual object (via various forms of Bayesian prediction, for example) in the way a human mind processes and hence sees (for a review of this and various other ways Turing theoretic computational dualism has become ubiquitous, see Sheutz 2002).

Turing has been enormously influential in many ways, and his view has its roots in earlier ideas – for example, Cartesian dualism and clock mechanisms, which once provided inspiration for understanding the human body (see Hacker 2007, esp. 233–257). But here I am recounting some of the inventiveness I have seen around me in terms of a certain vision of the human. A concern with body mechanics in particular points of time and space has motivated us – not to investigate philosophical ideas about humanness but to pursue pragmatic goals. We have sought visions of human endeavors and human communicative actions that could lead to new ideas and inventions. A body-emphasizing, time fixed view has helped us to achieve this. It has highlighted problems and needs as we saw them – the kinds of things we thought we could solve.

This view ought to be judged by what it allowed us to do – to produce new inventions, new designs for the communications technology landscape – so it worked for



us. It allowed us to focus on more complex technologies than other views might have done. We turned away from early versions of instant messaging because we thought that they were technologically prosaic and mundane in terms of the richness of the (human) communication in question. We turned instead to the technologically more elaborate audiovisual systems to address what we saw as more profound issues of human communication. Our view led us to focus on complex bodily matters, where the bonds of communication are sealed by a sense of being together in real time and in shared space. We were less concerned with matters that might be measured in terms of human value or intention which transcend and are indifferent to time and space. The shared whiteboards were used for some fairly complex social actions (such as play and romance), but we viewed those behaviors as less interesting to invent for because they used only simple technologies and simple behaviors. In our judgment, they used only one mode of bodily action – the keyboard. Our other inventions seemed more appealing since they used multiple modes of bodily action as well as more elaborate technologies. We were drawn to multiple sensual dimensions in communication. These sensual dimensions were related to the senses of the body only, not to the senses of the mind; to what could be felt in the here and now. More dimensions of real time connectivity would demand more innovative technological solutions, we thought.

### Squeezing Humanness into Bodies

How does one judge such motivations – by comparing them against richer visions of the human or by simply counting how many inventions derive from using that view? These are not the same measure at all. We ought to be kind about these motivations and generous too in our measurement of them. They drove us to invent and produce a lot of IP – both invention proposals (the first documented stage in applying for a patent) and intellectual property. Nevertheless, paradoxes were observable in the circumstances of the work in question just as they were in the scope of the inventive drive.

As I noted, when the video tunnels experiments were completed, we packed up the enhanced system and went back to the old audiovisual system. There were some practical reasons for doing so. The new set-up was bulky, for example. But we also didn't imagine that we would find it useful for ourselves in our own activities. Its richer set of bodily fittings did not actually equal an easier mode of expression. Indeed, the contrary was true. Whenever one used the video tunnels or the simpler audiovisual system, bodily fittings – mutual glancings and lookings – were only part of the implications of the actions in question. When I shared a video connection

with other people, they were interested more in why I wanted to glance at particular objects than in the objects themselves. Making a video connection was a powerful act. It was a kind of intimacy – a closeness that not all of my colleagues thought was appropriate. By *appropriate* here I am alluding to the moral implications of such acts, not their physiological ones. One motivation implied was that we were seeing if our colleagues were really working. This could be a management act, a kind of surveillance. Many colleagues resented such intrusions. Another could be to deepen a relationship. Indeed, one couple in EuroPARC became well-known for using the media space for precisely this activity. But because this was so, other attempts to use the media space became suffused with questions about whether such use was similarly motivated – an attempt to push the boundaries of work collegiality. But such concerns were beyond the scope of our inventive landscape, and we did not worry about them. When we did bother to look at them (over coffee or when we reflected at the end of the day), we saw that these concerns would be tricky to unpack and use as a basis for design. We recognized that issues of human action were relevant here, but our instincts were to avoid them; Turing's aversion to moral overtones encouraged us away.

If we had problems fitting the mind's landscape to the audiovisual system of EuroPARC, today we have even more problems fitting the mind to the latest systems that we have devised to allow interaction over distance. With the media space, we played with the infrastructure, but with our new interaction-rich conference systems, we don't even play. After experiments are completed, they are packed up and put away. My colleagues have no desire to use these systems for themselves. Again, they use the phrase *ordinary people* to suggest that others, somewhere else, might be willing to do so. But they view as uninteresting the question of why they themselves don't want to use them. Answers to that question don't lead them to think of any new inventions. It doesn't seem to have any pragmatic value.

This attitude reflects an indifference to intention and expression – a casual looking away from what one might label *mindfulness* in human action. To say again, I think Turing is a primary source of this. He deliberately chose to focus on the bodily side of human action so as to avoid considering the other side, the mind – or as I am suggesting, the expressive and intentional – and so too do many of my colleagues and I when we invent. Other things might be done with the technologies we invent, and human endeavors encompass more than we design for. But that more, whatever it might entail, didn't – and most often doesn't still – interest us when we get on with our work, our inventing business. We focus instead on what we think is a better route to inventiveness. One consequence of this is that it leads us to disregard technologies that might be more influential in the world at large (such as instant messaging). The audiovisual technologies that we invent seem to

be introduced to a world that seems largely unimpressed. But we are impressed by our inventions. We are inventing for a richer human experience, and we think that this will keep us at the cutting edge of invention even if the people out there in the 'real world' haven't yet come to adopt those technologies. We are inventing for the future of communication, even if that future never seems to end up turning into the reality our inventive spirits expect.

## Placing Pragmatism

Turing was not alone in developing the basics of this pragmatic view or in constructing visions of the human that divide mind and body. But both our use of his view and also Turing's motivation should not be treated as being philosophical or ontological (that is, as having to do with true measures of reality or in this case humanness). As I say, our concerns, like Turing's, were with other matters. For us, it was with invention. For him, it was to craft an understanding of what computer algorithms could do.

Other thinkers in the 1930s weren't pragmatic in this sense and sought instead to offer visions of the human that they claimed were truer, more scientific. In psychology, for example, B. F. Skinner and various others developed what came to be called *behaviorism* at pretty much the same time. Behaviorism was fiercely opposed by many at that time and ever since. This period created a watershed between different sciences of the human. Sociology and anthropology started to oppose any attempt to split mind and body (their practitioners were particularly averse to behaviorism), for example, and have continued in their aversion. The leitmotif of one of the major sociological books of the early postwar period, Talcott Parson's *The Social System* (1951), was critical of behaviorism, and though his alternate vision of the human is no longer fashionable in sociology, his opposition of behaviorism certainly is. These disciplines have also shown persistent aversion to what might be said to be the opposite side of behaviourism, a focus solely on the mind and its purported structures, most often assumed to be computational (such as structuralism associated with Levi-Strauss in the 1960s and 1970s and the mentalism associated with Jerry Fodor in the 1970 and '80s. See Levi-Strauss, 1963; Fodor, 1975). Meanwhile, philosophy developed a response to Skinner and to Turing, especially as Turing in his later papers started moving from pragmatism toward a kind of ontologizing. A colleague of Turing's at Cambridge University, Ludwig Wittgenstein, developed his philosophy in response to the kinds of reasoning that were underscored by Turing, creating a wholly different path of reasoning about what it means to understand human action. In his view, intelligence is not something that can be

properly understood by an empirical test. It's a conceptual framework leading to ideas about culture, practice, rule following, and, yes, occasionally demonstrable proofs or tests. This is essentially what Wittgenstein's *Philosophical Investigations* (1952) is about. Turing, Skinner, and various other proponents of dualism may have persuaded some but not by any means all.

## The Limited Human

If a concern with the body doing the communication has been central to the inventive landscape of the past twenty years or so, one of the correlates of this view is that the body is also a processing machine, one with limits. For many contemporary researchers on communication technology, that the human machine has limits and thresholds is the starting point of their endeavours. Whilst my colleagues and I have sought to offer richer ways of supporting body interactions between humans, for interactions between humans and computers, and eventually, for interactions between humans via computers, others have in mind the idea that the human – the user – has specifiable limits of attention and processing, beyond which they cease to be efficient.

This view helps guide another set of research activities that I see around me. As I write this paper, some of my colleagues are seeking ways of filtering communications so that only the really important are allowed to get to the top and to interrupt. Their technique involves gathering empirical data about human doings which are combined to produce rule-based systems that determine the kinds of messages that ought to be allowed through and the kinds that should not be allowed.

At first glance, these applications seem appealing. One can almost hear ordinary users shout out with glee at the prospect of having a tool that automatically sorts their emails and leaves them to deal with only the really important ones.

In these research activities, however, the model of the human that underscores how they do this business inverts the Turing theoretic approach. It concerns not the body but the mind – though there is an essential commonality here. This metaphysics is still dualistic and renders humanness quite peculiarly because of it. Both this view and the body-emphasizing view have been adopted largely for pragmatic reasons. Just as some researchers have looked at movements of the body to inspire their inventive imagination, the this set of researchers have looked at what they think of as the mind (or the *brain*, a word they use interchangeably with *mind*) for heirs. The researchers in question have a somewhat elaborate notion of what the mind might be. It is a vision that includes certain notions about how the mind works that one might not assume from, let us say, a commonsense perspective. These notions

are used to inspire a particular line of inventive inquiry. For example, pretty much at the same time as the media space was being developed at EuroPARC, a number of researchers developed a wholly different yet interdependent set of technologies that could allow computers to replicate what they thought was human memory. These researchers had the idea that the human mind wasn't merely like a computer but was rather a somewhat bad computer that suffered from retrieval problems. In this view, the mind had data in its stores but didn't have the right mechanisms to identify which data ought to be retrieved at any moment in time. Memory (or more exactly the problem of recollection) offered an example of this, and researchers assumed that the difficulties people had in remembering were proof of their computational inadequacy.

With this idea as a motivator, researchers built a system that created a visual record of what people did during a day (or at least what they did in the lab where the infrastructure worked), and these records could be replayed as prompts when recollection was required. The system functioned by having every user wear a badge that communicated to the embedded systems whenever a user sat down or moved anywhere within the building. This immediately prompted the audiovisual systems (the media space) to create a trace (a set of video segments) of that behavior. At the end of the day or week, the user in question could get the system to replay the video (see Newman et al. 1991).

Watching the resulting videos turned out to be fun. The viewing angles of the cameras used to collect images were often odd: heads would be missing from some views, and only the tops of heads would be visible from others. One could vary the speed, too, so that the video would play like a 1920s movie, with a kind of staccato performance of the actors in question (oneself and one's office colleagues). When set fast, the video made one look frenetic, when played slowly it made one look indolent. Despite this amusing side, some researchers claimed that it invaded their privacy, even though it was shown to be no more invasive than the media space without the addition of badges. What seemed more salient to their complaints was the fact that the badge system seemed to be an icon for what group or gang the researchers in question wanted to be seen as affiliated to – the badges outfit or some other.<sup>8</sup> The political issues notwithstanding, the system itself did not get used for the ordinary work of the lab or its staff. My colleagues did not feel that they had any need for the technology. As with the media space, this technology seemed designed for others, somewhere else, with other problems.

Some years later, a similar technology has been built in my current lab (see Hodges et al. 2006). In the former case, the data were captured by systems in the built environment (the media space and its associated networks and database systems), but this new approach captures the data in the devices worn by users. It reflects de-

velopments that have been made in hardware in the time since the EuroPARC was built (the late 80's). But the new technology has a similar set of ideas behind it, with some minor differences and refinements. Before, the mind was viewed as some kind of multi-element computer system with a database for memory and another system for retrieving memory data. Now, the mind is still viewed as some kind of container, but the view is augmented with the idea that the mind has an internal display (like a cinema screen) – a qualia – of its external inputs. The technology offers a kind of external replica of this qualia – a visual record of what the user or the wearer would see.

As with the prior research, a concern has been to see if the system can help address problems of memory, but here the question has been to offer a supplement to the dataset that is constitutive of memory rather than a mechanism for its retrieval. In this case, the devices in question (which are remarkably similar to the badges deployed in EuroPARC) have been designed to be worn by the user so that what they do can be captured, and the devices themselves do the capturing by automatically taking hundreds of images over the course of a day. The devices can take several thousand images before they are full and might last more than a day or two. Having caught the pictures, the technology has been designed so that users can be download the images on to a PC and, with the right program, replay them or view them. As with the EuroPARC system, these pictures can be played quickly or slowly and make the activities of the subjects look peculiar in various ways. The staccato effect is still there, as are the orthogonal views (a head seen from below, a desk seen from an unusual angle, the device sometimes hanging down and almost touching the desk in front of a wearer). Some of my colleagues have used the devices to see what they are like, but none have ended up using them as part of their routine activities. As with prior systems, the assumption that seems to have motivated this research was that the devices would help others – others who might have memory problems derived from senility or another form of neurological decay – but not the researchers who devised the technology.

One or two researchers (myself included) have investigated whether the devices might be used as wearable cameras and not as things intended to aid the brain. Our research into gathering pictures in this manner (by having a wearable device that automatically captures images) has found that people use such pictures not as mirrors of the past (as qualia) but as vehicles to exercise their imaginations. They use them to look anew at what they recollect, to see it in a different light, or even to see and discover aspects of their affairs that they would normally neglect.

The lesson we took from our research was that, in normal life, a person's sense of the past and of memory is not thought of (by them, our users) as a trail of material stuff that is collected by their minds. In their view, the past is a place that they

looked at with fresh eyes and often differently when they recalled it, depending on their purposes for recollecting. Our study participants used the devices to help recall the past, but their purposes (to tell a story, perhaps) did not encourage the idea of memory as a container that is gradually filled up. None of these concerns would lead one to imagine that the head has a film (a qualia) inside it replaying. We came to see that recollecting moments from the past – moments selected from further away or nearer in time – was better thought of as a constructive process than as a computational one. The past seemed to be a much more complex place to visit and comprehend than the vessel metaphor (and the qualia concept) would allow.

Some philosophers have difficulty accepting the idea of qualia. As Norman Malcolm notes in *Memory and Mind* (1977), the qualia thesis cannot be accepted as true for the simple reason that there must be a qualia for every event, including memory events. Each time there is a recollection, another qualia will be created, and each time someone recalls that recollection, there will be another in turn, ad infinitum. Ultimately, the qualia concept suffers from the problem of infinite regression.

But my colleagues don't worry themselves with these philosophical doubts. Because they are constructing a view of the mind that is entirely pragmatic, not philosophical, they disregard the problem of recursion; for them the idea of qualia is a pointer toward inventions that might solve something. They have come up with the idea that they might control qualia through filtering. In this way, one would not keep producing endless qualia that would fill up the mind (so to speak), but one would present qualia that summarized and triaged the past. They have been seeking to devise techniques that will recall only what matters. To do so, these researchers haven't confined themselves to visual traces of action (as the original badge-based system did) and have sought instead to try to assemble as much as possible about the inputs that humans manage.

For example, in an early but nevertheless good introductory paper, "Models of Attention in Computing and Communication: From Principles to Applications," Eric Horvitz and colleagues (2003) explain how to use sensors to create the stuff that constitutes qualia and then how to sort or triage this stuff to provide only what counts. The sensors in question include "microphones listening for ambient acoustical information or utterances, cameras supporting visual analysis of users' gaze or pose, accelerometers that detect patterns of motion devices and location sensing via GPS and analysis of wireless signals ..., online calendars and considerations of the day of the week the time of the day" (54). This material is then analyzed through probabilistic attentional models that the researchers hope can determine what the users really need to recall. Basically, this involves measuring the frequency of incidents at some moment in time and the frequency of the recurrence of those

same incidents through time. These statistics produces weightings that allow the system to distinguish the relative importance of incidents.

This is well away from the problem of glancing and touching, of looking and peering, that we saw with the media space system. It might seem well away from communications too, but when one can see easily how this view can lead researchers to address the problem of communications overload. In this view, the a user manages multiple mental tasks and is concerned about reducing the burden that these tasks impose: people think of themselves as machines, in other words, and worry about optimizing their performance. Technologies derived from this point of view help them in this.

For example, some early attempts to do this looked at home life. Here, the models were designed to ascertain what would be a good time for a message to be received, to interrupt whatever the person was doing, and when would not be. But these models didn't work, since people's preferences were not only idiosyncratic, with unique rules and requirements, but also changeable – a person's mood seemed as important a factor determining whether someone wanted to deal with a message as any other more objective measure (like the intensity of the other activities they were engaged in).

More recent research has focused on work settings, where the problem of determining whether a communication is an interruption is made by comparing the nature of that communication to the tasks that the recipient of messages is currently engaged in. These tasks are captured by accessing the person's activities on their PC. If they are preparing a spreadsheet then a message will only be allowed through if it pertains to the topic of that spreadsheet (assuming that the title gives some indication of topic); if they are web browsing in relation to some project then the 'interruption management system' will only allow messages about that project through, and so on.

Unfortunately, though these systems sound appealing, in practice they rarely go beyond prototype. Even the inventors of the systems admit that they don't like using them much themselves. They miss the interruption of messages, they explain; when they use the systems, they feel as if they are getting 'out of touch'. Besides, outside of lab settings, it is almost impossible to gather all the data required for the systems to work. It is little wonder therefore they never see the public eye.

Whereas these systems seek to inhibit messaging, other system simply triage, allowing the user to choose how many they want to attend to at any time, but offering hints as to which is most important or urgent. These systems also have problems. They tend not to succeed with person to person type messages, since it turns out there is no effective way of identifying importance. For example, some systems use the identity and status of the sender as a criteria to distinguish between impor-

tance; others the frequency of messaging; some do both. But these criteria don't work in a way that pleases the users. With these systems, mail from the boss gets through but infrequent email from a colleague does not; messages from those who message too much do. The subtle patterns of social action that give messages their meaning gets lost. Again, these kinds of systems never get beyond prototype.

As a result of these failures, some researchers have turned to blog postings with a view to helping filter these in a way that lessens the burden placed on the person trying to keep up with them. At the current time especially, there is an interest in analyzing Twitter feeds and selecting from them only those that the users 'really want'. The systems do this by storing and analyzing prior selections the users have made, and 'learning' from these 'click-throughs' what the user will prefer. These systems also look like failing. It is not that sometimes those who use Twitter want to read what has been said on a particular subject. It is rather that part of the charm of the blogosphere is accessing it leads to the discovery of new topics and threads. It is precisely because these topics change that people turn to the blogosphere to keep up to date. Systems that use predetermined topics to select content miss the point. Though they reduce the amount of content sent to the user, they suffocate the desire that gives life to the act of blogging in the first place.

## The Metaphysics of Overload

The perspective that has motivated these research endeavours brings to mind many recent books that aren't about acts of communication but are more concerned with our information saturated lives, such as Richard Lanham's *The Economics of Attention: Style and Substance in the Age of Information* (2006). This is an exposition by a literary theorist of how an economic perspective might be applied to the problem of searching, navigating, and finding delight on the Web. But arguments about humans as information processors – as machinelike entities with limits – are old hat. For example, Norbert Wiener's 1948 book, *Cybernetics: or the Control and Communication in the Animal and the Machine* is a manifesto of a view that emphasizes the idea that a human body is an information-processing machine and in particular a processor of communicated signals. This sounds very much like the modern psychological theory that Horvitz, Nagel, and others evoke; it also sounds very pertinent to our current concern.

Wiener argues that the stuff people process (like the words conveyed in a message) is like any other kind of stuff that the body might receive and produce; as material to be processed. He argues that the processing machine (the human) has certain key properties. In his view, processing of stuff, whatever that stuff is, must

stabilize or else the system (the human) will break. Wiener proposed that this stabilization – this performance, as he put it – could be measured quantitatively. He offered in *Cybernetics* (and elsewhere) mathematical techniques and concepts that he thought would help to measure this information processing so that people could predict processing optima and processing stability.

In the 1940s, many people found this view profoundly appealing. They came to think of cybernetics not as a label for a point of view but as a science of predictive models of human behavior. The echoes of this particular claim were heard across many disciplines and were so loud that universities set up departments of cybernetics to investigate what the human processing machine might be. Many disciplines viewed this as a key turning point in their development. Ergonomics, for example, saw cybernetics as solving how a symbiosis of man and machine might be analyzed. With Wiener's ideas at its heart, it came to describe human-and-machine systems in which the two could work together harmoniously by optimizing the processing burdens of each. One set of stuff to process was what a machine was good for, and another set of stuff to process was what the person was good for.

This sounds very much like the approach taken in a contemporary discipline, Human Computer Interaction, or HCI. Cybernetics and modern HCI do have something profoundly in common. Wiener's view seems to be essentially the view of many of my contemporary colleagues (whether or not they would admit it), particularly those addressing issues of overload. But it is also closely related to the views of those who take a more Turing theoretic position. Indeed, the view of the human in both perspectives merges in a consequential way in the landscapes I am describing – the inventive world of corporate research. In Wiener's view, the user is treated as a machine of sorts – as a processing machine. But the user is also thought to be something that exists only in real time – what it processes is only inputs and outputs in the here and now. And it is this concern with space and time that is common with those who emphasize the body.

In terms of the technologies that this combined vision produces – a lot of it is very innovative and useful. It has led to novel ways of communicating across distance and healing the apparent misfit of perspectives that early communication systems generated; it has led to richer ways of interacting across distance. The vision has also led to interesting approaches to the problem of overload, offering various techniques that calculate when too much is too much. All of this points towards new ways of communicating that heal the problems of distance and separation and do so without demanding too much of the user.

Nevertheless, this combined vision has looked at acts of communication with a reductive lens. Those who invent under the auspices of a Turing theoretic point of view or a Wiener like information processing one, only concern themselves

with some kinds of communications acts, not all. Indeed, this vision is emphatically missing important concerns. This perspective lacks interest in material that is somehow beyond processing in particular moments in time or space. There is very little mindfulness in the human machine that communicates here. For example, aspirations and hopes for the future don't matter for the human in the centre of this vision; these are not substances that can be processed in the same way that real time input and output signals can. They cannot be fixed in some spatio-temporal location (though where someone is will often help cultivate them). Similarly, recollections and laments about the past do not fit into this vision either. Nor do the feelings that one cultivates for another through acts of communication, especially if those feelings are beyond or distinct from those created through activities that entail 'being together in the here and now'. Digitally created analogues for togetherness that the body centric and information processing view produce, namely those created by Wave, by media space technologies and so on, don't allow for these elements of the communication acts to emerge. This is hardly surprising; they were not designed with them in mind.

In sum, the Turing theoretic and Wiener cybernetic vision does not allow inventiveness to address what Peter's calls the metaphysics of togetherness (1999). The efforts of my colleagues and I has not changed the landscape of communication in ways we expected or hope. Though some of our ideas do manifest themselves in technologies that get widespread take-up, most don't.

Besides this disappointment, there is a discontinuity between our thinking at work and our thinking elsewhere, when we abandon our work and professional hats. What is thought of as the limits of expression, as the limits of our efficiency from this Turing-Weiner view, does not equate with the everyday human measures of expression and expressiveness that we apply when we go home. Nor does our work vision allow us to comprehend and explain the criteria that we ordinarily use when selecting between, say, the written word or a videocall at home. In my professional world – in Wiener's and Turing's world – users would choose video conferencing if they were able to and if it doesn't overload them. Efficiency in this view is all about getting as much as possible, given particular cognitive limits. But at home, few of my colleagues or I often use *Skype* or other video mediated communications. We do use them, but not always and indeed not often. But our work selves cannot account for this. Choosing to make a video contact in the domestic sphere is not made on the basis of how this mode of communication provides a richer array of sensual fitting – seeing as well as hearing, gesturing as well as speaking. It is chosen in large part because it makes the act of communicating special in itself. One doesn't use a video to call merely to communicate, but to make the act of communicating special – and, in so doing, making the parties involved special. *Skyping*

turns out to be one of the ways that distributed families constitute a sense of being a family. It's not what is said on a video call that matters, it's the mere doing of it that does (see Ames et al's 2010 paper, 'Making Love in the Network Closet: The Benefits and Work of Family Videochat'). That we do not appreciate these subtleties when we have our work hats on reflects the limited way we use the pertinent terms. At work, the expression *amount of words* is simply a synonym for *volume*, not a measure of adroitness, thoughtfulness, or neglect.

Turing believed he was inventing a new discipline, one that dealt with algorithms. But this vision also included a view of the human. As it happens, Wiener thought that the science he was inventing, cybernetics, was all about people, even though his science was enormously mathematical, and hence quite close to what Turing thought he was doing. But the world view that these individuals has produced is one in which people – the users – turn out to be not very human at all. They have human like capacities and human like behaviours to be sure, but they are so reduced in their sensibilities that the humanness has been taken out. The performers of communication acts are like robots or animals. We can see that this is so because when people complain about too much email or too many postings on their social networking sites it is precisely because of things bound to the human condition, to the sensibility that the metaphysics of communication has produced for us; animals and machines can neither sense that or understand it. It is not about space, time or information processing. It's something more, something greater; about being in touch but when being in touch is a moral matter, not a physical one.

## Conclusion

Based on the arguments presented in this paper, it should be clear that the world that I live in, like any organizational world, cannot be easily mapped out like the geography of a country. But it is a landscape of sorts. It has certain salients that, once described, can provide a sense of what it might be like to move around within it. Some places are commonly investigated, and others less so. Some domains seem almost beyond the pale. This landscape has a kind of unity or general patterning that gives it particular form. But one might also say that this landscape is not systematically laid out by any plan or map. Although this landscape may be the place my colleagues and I traverse and although its shape might lead us in some directions and not others, our sense of this place as we go about our daily lives is not perfect or clear. My intellectual landscape is like all landscapes. I navigate through it with routine and habit, and then occasionally my sense of it is disturbed by moments of reflection and doubt. There is a sense sometimes that one is seeing something new

– a vista beyond what has been seen before or a wood that is at last recognized, since we have somehow escaped from the trees.

Despite sometimes getting lost, my colleagues and I have a notion that what we are doing and where we are going does have some sense or purpose; a direction even. We are afflicted by a conviction that somehow and for someone (our colleagues and our managers perhaps), what we are about does indeed have reason. This landscape and our personal convictions about our trajectories through it have led us to invent not just anything. It has led us to explore technologies of a particular kind, ones that reflect what we have come to think of as the geographies of human communication. In our landscape, the human is a kind of body, a machinelike body, and the nature of its communication is machinelike, too, with thresholds, limits, and processing requirements, all of which are fixed in particular spaces and times. Communication is about bringing machinelike bodies together, across or through space, without overloading their systems.

All this might seem a long way from the questions asked at the start of this paper: namely, what is the relationship between computer science and sociology in the world of technology research? And, what is the model of the human that underscores the research carried out in this world? But there is a link, and the link is a paradox that has to do with how the professional world I have described – my own world – leads members of it toward an end point. Our very practices of inventing for that end point create demonstrable proofs that the human model we have is not the one we orient to in our worlds outside the labs. What we invent, we don't use. Though people on the outside might take up elements of what we invent, we don't get excited by those applications, thinking them too feeble to be worth investing in. We invent for one world and live in another.

The examples provided in the paper indicate the direction of the inventive imagination behind research into new communications. The direction leads us along a path where more is viewed as better. The fate of the shared whiteboards illustrates this. If they allowed a number of persons, separated by distance to see what each other wrote, then we imagined that offering them the ability to see their correspondents would be better, more appealing, a closer fit to the geography of their natural communication acts. Hence we turned to the media space and neglected the whiteboards. And if one has the written word and sight, why not also have gesture? Hence we turned to C-slate. Our moves were intended to take the user from a monosensual mode of expression to a multisensual one; from impoverished geographies of interaction to richer ones.

The examples show how this view, a credo if you like, leads my colleagues and me to invent applications, devices and technologies that are designed to allow the communicating, processing body to do more. I have noted that we have been fum-

bling, but persistent, in our efforts to do this. Our understanding of what this more might be is bound up with our vision of the human – which emphasizes action rather than intention and quantification rather than quality. This credo also has a notion of limit, too, which is our goal. We orient our designs to an end point when the user will have enough – at time when a system or set of systems will offer all that is needed or all that a person can handle. We are, after all, machines, and like all machines, we have limits.

Yet all our efforts lead to another question. For why do we keep inventing new communications technologies and yet continue to use some of the old technologies that our inventions are intended to replace? Something about the old ones appeal. What? It seems to me that our work selves hold a view of the communicating human communication and our private selves have another and it is these private selves that keeps us using the old technologies our work selves imagine we have done away with.

The reason for this, it seems to me, is that these private views are richer, more subtle, more accurate than the work views. These private views – the private self if you prefer – understands that communication is not best thought of in terms of volumes, capacities, and scopes – the view that our work selves deploy. Our private selves are charmed by the different experiences that communications channels afford, not by the way they offer more sensualities (sight, sound, and touch, for example) but by how they broaden our expressive repertoire. Our private selves know that this repertoire is not to be indexed by behavioral geographies alone. In our private lives, we are deeply familiar with the fact that there are many dimensions to expression – variety, depth, lightness, spontaneity, and ease. We know, too, that we can find enjoyment in some channels because they are private and find enjoyment in other channels because they are public. And we know as well that a withdrawal from communication can allow us to recast our intentions in another channel. We know that a letter, written alone and diligently crafted, can say much more than a videocall could ever allow us to say. In sum, our private selves recognize that *more* in this sense has a meaning that is quite unlike what the word *more* means when it is used in our inventive endeavors at work.

Here lies one of the paradoxes of our contemporary communications age – how the credo used in certain inventive landscapes that have helped produce some of the communications infrastructures we see around us is so impoverished when compared to the views of the human captured in, evoked by, and oriented to in ordinary reason and everyday language. I am thinking here of everyday folks getting on with their ordinary yet complex lives and using communication means as opportunities to manage their diverse affairs. Our scientific selves seem to invent for a future that is expected to be populated with humans that are somehow much

less than this, and though these people are more machinelike, this is not because they are complex but because they are simpler and as a consequence less human because of it.

And if that is so there is a greater question that follows on from this. If the technologies that this credo leads to don't get used by the world at large as expected, how does one account for the technological landscape that does exist? If the inventors can't be said to produce it, who has? Is it an interplay between the products of invention and the desire of the users that shapes the technological landscape? The question that motivated this paper was 'Who is the user designed for?' The paper has explored the interplay of technological, mostly computer science visions, with what may be described as more sociological visions within two research labs, and has explained that the latter views haven't really been very influential. A kind of bodyism has been more central to what has been developed. And yet it has not been this bodyism that has led to the evolving landscape in the world outside the labs. The paper has made it clear in its conclusions that there are no 'bodyists' out there, in the 'real world'. In so doing, this paper has also begun to suggest that one might want to look at practices rather than at invention, at what people do rather than at what those in the inventing trade think people do, to understand the true evolution of invention. If, within research labs, there is an interplay between the imaginations of computer scientists and sociologists, then in the 'real world', outside the labs, there is an interplay between everyday reason, a kind of lay sociology, and the technology at hand. It is this that shapes and creates the landscape. What I have described are one of the main fertilizers of that landscape, the world within IT research, but I haven't described that landscape itself. Others can undertake that.

## References

- Agre, P. E. 1997. Towards a critical technical practice: Lessons learned in trying to reform AI. In G. Bowker, S. L. Star, and W. Turner, eds., *Social Science, Technical Systems and Cooperative Work* (131–157). Mahwah, NJ: Lawrence Erlbaum.
- Ames, M. Go, J. Kaye, J. & Spasojevic, M. 2010 'Making Love in the Network Closet: The Benefits and Work of Family Videochat', Proceedings of CSCW2010, Savannah, ACM Press: Chicago.
- Bainbridge, L. 1983. The ironies of automation. *Automatica* 19(6): 775–779. Reprinted in N. Moray, ed., *Ergonomics: Major Writings* (vol. 4). London: Taylor & Francis, 2005.
- Bittner, E. 1977. "Must we say what we mean?" In P.F. Otsword ed., *Communication and Social Interaction(180-197)*. New York: Grube & Stratton.
- Fodor, J. 1975. *The Language of Thought*, Cambridge MA: Harvard University Press.
- Gaver, W. Moran, T. Maclean, A. Lovstrand, L. Dourish, P. Carter, K. and Buxton, W. 1992. Realizing a video environment: EuroPARC's RAVE System, *Proceedings of CHI 92*, ACM Press, Amsterdam, Netherlands, pp335-341.

- Hacker, P. M. S. 2007 *Human Nature: The categorical framework*. Oxford, Blackwell.
- Harper, R. 1992. Looking at ourselves: An examination of the social organization of two research laboratories. In *Proceedings of CSCW '92, 31st Oct.–4 Nov. (Toronto)* (330–337). New York: ACM.,
- Harper, R. 1996 Why People Do and Do Not Wear Active Badges: A case study, *CSCW: An International Journal*, 4: 296-318.
- Harper, R. 2005a. From teenage life to Victorian morals and back: Technological change and teenage life. In P. Glotz, S. Bertchi, and C. Locke, eds., *Thumb Culture: The Meaning of Mobile Phones for Society* (101–113). Bielefeld, Germany: Transcript Verlag.
- Harper, R., and L. Hamill. 2005. Kids will be kids: The role of mobiles in teenage life. In L. Hamill and A. Lasen, eds., *Mobile World: Past, Present and Future* (61–73). London: Springer-Verlag.
- Harper, R., D. Randall, N. Smyth, C. Evans, L. Heledd, and R. Moore. 2007. Thanks for the memory. In *Interact: HCI 2007* Lancaster: British Computer Society, Swinton, UK.
- Harper, R., D. Randall, N. Smyth, C. Evans, L. Heledd, and R. Moore. 2008. The past is a different place: They do things differently there. In *Proceedings of DIS (Designing Interactive Systems)* (271–280). New York: ACM Press.
- Harrison, S. 2009. *Media Space Twenty+ Years of Mediated Life*, Godalming, Springer.
- Hodges, S., Williams, L., Berry, E. Izadi, Srinivasan, S. Butler, A. Smyth, G.Kapur, N. and Wood, K. 2006. SenseCam: A retrospective memory aid. In Dourish P. & Friday, A. (Eds) *Proc. Ubicomp 2006* (177-193). Springer, London.
- Huurdeman, A. A. 2003. *The Worldwide History of Telecommunications*. Hoboken, NJ: Wiley.
- Izadi, S., A. Agarwal, A. Criminisi, J. Winn, A. Blake, and A. Fitzgibbon. 2007. C-Slate: Exploring remote collaboration on horizontal multi-touch surfaces. In *Proceedings IEEE Tabletop*, Newport, RI. IEEE.
- Lanham, R. 2006. *The Economics of Attention: Style and Substance in the Age of Information*. Chicago: University of Chicago Press.
- Levi-Strauss, C. 1963, *Structural Anthropology*, Basic Books, New York.
- Maffesoli, M. 1996. *The Time of the Tribes: The Decline of Individualism in Mass Society*. London: Sage.
- Marr, D. 1983. *Vision: A Computational Investigation into the Human Representation and Processing of Visual Information*. New York: Freeman.
- Malcolm, N. 1977. *Memory and Mind*. Ithaca: Cornell University Press.
- Nagel, K., J. Hudson, and G. Abowd. 2004. Predictors of availability in home life context-mediated communication. In *Proceedings of CSCW04* (497–506). Chicago: ACM Press.
- Newman, M., M. Eldridge, and M. Lamming. 1991. PEPYS: Generating autobiographies by automatic tracking. In Bannon, L. Robinson, M. and Schmidt, K. (eds) *ECSCW 1991* (175–188). Kluwer: London.
- Noë, A. 2009. *Out of Our Heads: Why You Are Not Your Brain and Other Lessons from the Biology of Consciousness*. Cambridge: MIT Press.
- Parsons, T. 1951. *The Social System*. New York: Free Press.
- Peters, J. D. 1999. *Speaking into the Air: A History of the Idea of Communication*. Chicago: University of Chicago Press.
- Piccinini, G. 2003. Alan Turing and the mathematical objection. *Minds and Machines* 13: 23–48, Springer: London.



Schmidt, K. 2009. Divided by a common acronym: On the fragmentation of CSCW. In I. Wagner et al., eds., ECSCW 2009: Proceedings of the 11th European Conference on Computer-Supported Cooperative Work, 7–11 September 2009, Vienna, Austria, 2009 (223–242). Springer: Londoner.

Shanker, S. 1998. Wittgenstein's Remarks on the Foundations of AI. Abingdon: Routledge.

Sheutz, M., ed. 2002. Computationalism: New Directions. Cambridge: MIT Press.

Sudnow, D. 1972. Studies in Social Interaction. New York: Free Press.

Turing, A. 1936. On computable numbers, with an application to the Entscheidungsproblem. Proceedings of the London Mathematical Society 42: 1936–1937.

Turing, A. 1950. Computing Machinery and Intelligence, Mind 59, pp433-460.

Wiener, N. 1948. Cybernetics: or the Control and Communication in the Animal and the Machine. Cambridge: MIT Press.

Wittgenstein, L. 1953. Philosophical Investigations. Trans. A. N. Anscombe. Oxford: Blackwell.

**Author:**

Prof. Richard H. R. Harper, PhD

Principal Researcher

Microsoft Research Cambridge, UK

r.harper@microsoft.com

## FUTURE CHALLENGES FOR THE TELECOMMUNICATION INDUSTRY REGARDING THE INTERNATIONAL DELPHI STUDY 2030

*Bernd Wiemann*



## Forschungskultur: Methoden & Werkzeuge

**Time Travel**  
Today, Future Scenarios, Trend Radar

**Future Vision**  
Applied Research – Projects portfolio

**Group R&D Research Orientation**

**Group R&D Exploratory Activities**  
- collection, dialogue, exchange, overview

**Standards**

**Business Ethics**  
Radical Innovation  
Technology & Art

**Vodafone Chair Dresden**

**Cooperations (Vendor, Foundations, others)**

## BoomTown 2010 TrendMap

**innovation arena**

**resource management**  
CO2 footprint, energy balance, telco's franchise 2.0

**mobile**

**Power Line**

**Mobile Line**

**Green Line**

**Telco Line**

**Community Line**

**Health Line**

**Counter Line**

**iCare**

**erupting markets**

## The five forces shape industry competition

**Political** **Economic**

**Threats of Substitute Products**

**Threat of New Entrants**

**Rivaling among existing competitors**

**Bargaining Power of Suppliers**

**Bargaining Power of Buyers**

**Technological** **Social**

**RESULT**

- Changing profile of mobile operators in their industry
- Different roles in global communication markets
  - mature vs. growing
  - Different cultural / regional demands
- Different new roles in many industries as (communication) supplier, new entrant or with substitution
  - Health; Telematic; Bank; Advertisement; Content; Internet

**COMPETITIVE STRATEGY**  
TECHNIQUES FOR ANALYZING INDUSTRIES AND COMPETITORS  
with a new introduction  
**Michael E. Porter**

## Porter's 5 Competitive Forces

**(P)olitical/Legal Factors**

- Regulation/Deregulation influences Entry Barriers
- Industrial policy influences Rivalry
- Subsidies/Taxes influence Exit/Entry Barriers
- Research/Innovation policies influence Rivalry & Threat of Substitutes through innovation intensity & entrepreneurial activities

**Threats of Substitute Products**

- growth rate of substitute sales
- substitute manufacturer expansion
- profits of substitute firms
- Examples:
  - glasses vs. contact lenses
  - sugar vs. sweetener
  - plastic vs. glass
- Relative price/Performance

**(E)conomic Factors**

- Economic growth influences demand growth and thereby Rivalry & Buyer Power
- Other factor markets (financial, labor) influence firm strategies and thereby Rivalry or Threat of New Entrants/Substitutes
- Wealth distribution influences Buyer Power

**Barriers to Entry**

- economies of scale
- access to technology
- learning and experience curve effects
- brand loyalty
- capital expenditure
- cost advantages other than size
- access to distribution
- regulation
- Tariffs

**Reaction of Existing Firms**

- price cuts, advertising
- financial resources
- leverage with suppliers/buyers

**Bargaining Power of Suppliers**

**is higher when:**

- many and diverse competitors
- item is important to the firms in the industry
- switching costs for firms in the industry are high
- reputation of suppliers is high
- difficult for firms to backward integrate
- more firms relative to numbers of suppliers

**Bargaining Power of Buyers**

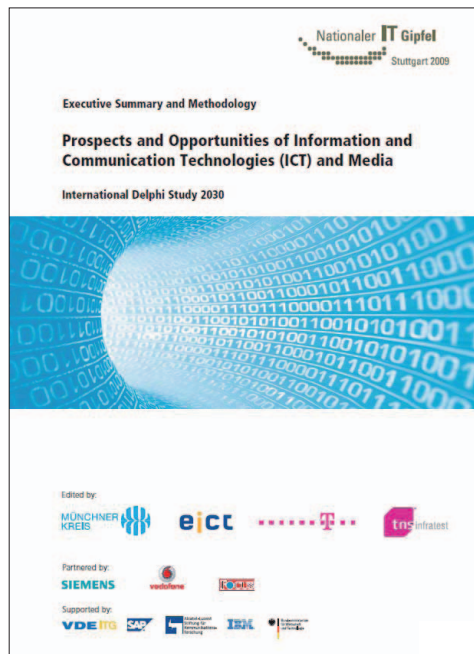
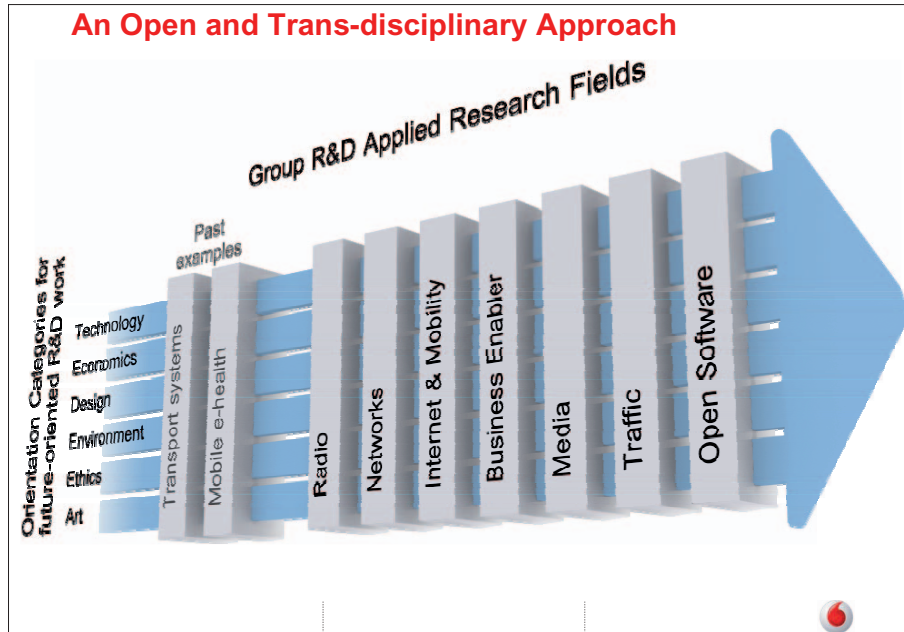
**is higher when:**

- New technologies lower entry barriers and thereby influence Threat of New Entrants
- they buy in volume
- have low switching costs
- difficult for firms to forward integrate
- have flexibility to buy from other firms
- product is standardized
- product is not very important to buyer's goods or services

**(S)ocial Factors**

- Social norms influence Rivalry, Supplier & Buyer Power
- Demographic changes influence Buyer Power

**Environmental Factors: PEST**



Herausgeber:  
MÜNCHNER KREIS e.V.  
EICT GmbH  
Deutsche Telekom AG  
TNS Infratest GmbH

Nationaler IT Gipfel  
Stuttgart 2009

## Prospects and Opportunities of Information and Communication Technologies (ICT) and Media

International Delphi Study 2030

Zukunft- und Zukunftsfähigkeit der Informations- und Kommunikationstechnologien und Medien

1. Social implications of ICT development
2. ICT innovation policy
3. Infrastructure development and key technologies
4. ICT - driver of innovation in central areas of application

Nationaler IT Gipfel  
Stuttgart 2009

## Method: Internet-based Delphi Survey

**Method profile:**

- 551 international experts** from business, academia and politics assessed
- 144 future scenarios** from various subject areas on the future and sustainability of ICT and media as well as
- 61 further Questions** on relevance, drivers and barriers etc.

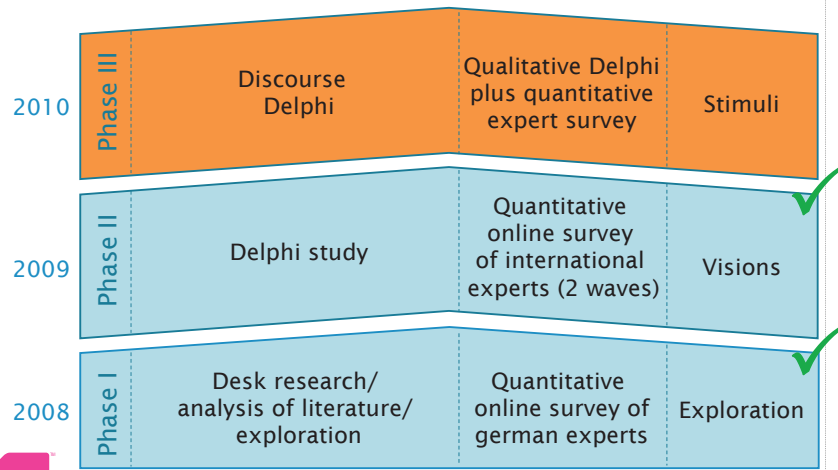
Two consecutive survey waves

**Publicity:**

- o **Downloads:** more than 50.000
- o **6 press releases**
- o **4 publications (2x report, 2x summary)**
- o **23 print articles, 2 radio features, 166 articles online**
- o **Events**

MÜNCHNER KREIS

### Three Phases to explore the Future of ICT and Media



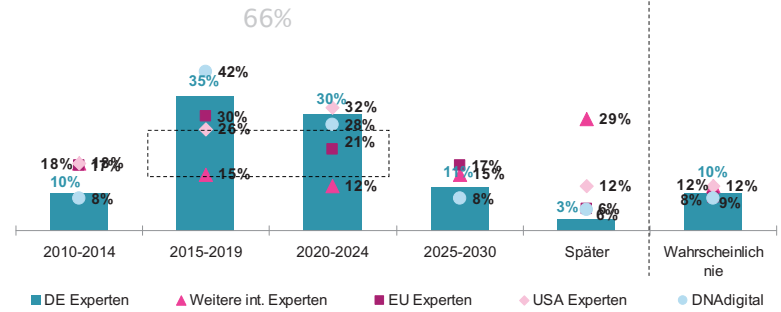
### Prospects and Opportunities of ICT and Media Core Messages

#### Message 1:

Digitization and the still increasing penetration of ICT into all areas of professional and private life will be even more all-embracing in molding the information society in the future.

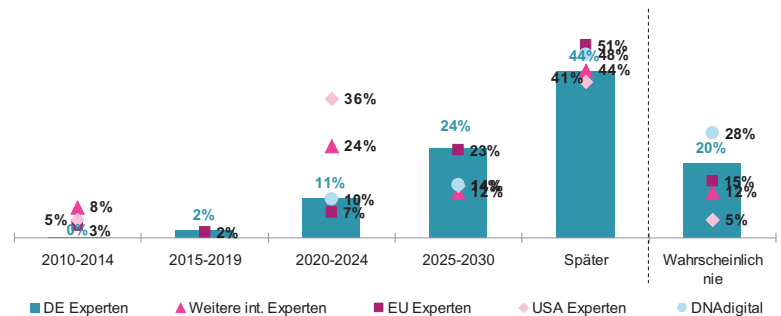
### National Internet Use

Thesis 1: More than 95 percent of the adult population in <country> actively and regularly use the Internet and its services.



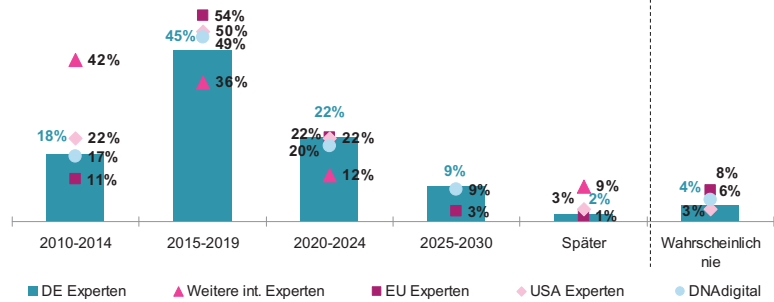
### Global Internet Use

Thesis 2: More than 75 percent of the world population actively use the internet several times per week (in 2008, approximately 16 percent, or 1.2 billion worldwide use the internet)



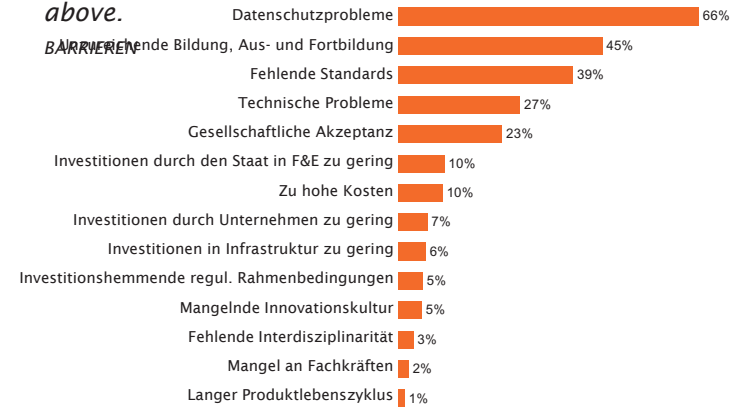
### Mobile Internet Use

Thesis 4: More people in <country> regularly access the Internet through mobile devices than stationary computers.



### Infomational self-dertermination

These 32 – Select up to three barriers from the following list that you consider to be most important for realization of Thesis 32 above.

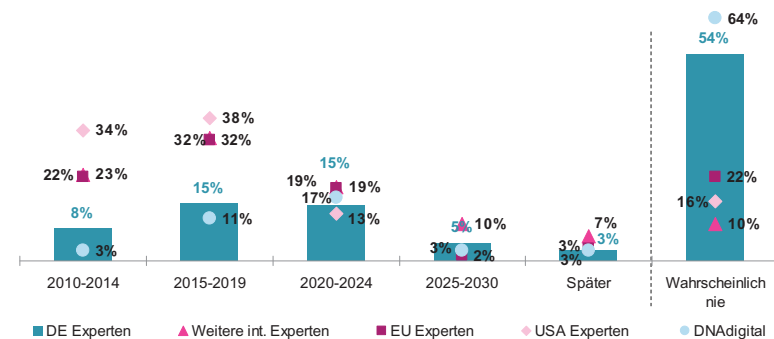


Abgebildet werden ausschließlich die Antworten der Experten für Deutschland.



### Informational self-determination

Thesis 32: An individual's control over the use of his / her personal data on the internet is protected by law in <country> (principle of Informational self-determination)



### Prospects and Opportunities of ICT and Media Core Messages

**Message 2:**

People's acceptance and trust in using ICT is the foundation for developing a modern and open information society.

**Message 3:**

High-performance communications infrastructure is a vital precondition and a strategic success factor for an open and competitive information society.

**Message 4:**

The mobile use of the Internet and its services will have a lasting impact on the information society and create independent new areas of application.

**Message 5:**

Dynamism in the ICT base technologies will drive innovation processes and have a serious impact on all key industries in the German economy.



## IKT: Key Challenges and Research Fields

### > Society Implications

- IT-Security
- Informational Self-Determination (eRubber)
- Digital Identity, E-Democracy, Freedom
- Education, Life long learning, Future Work place,
- Trans-Disciplinarity

### > Daily Life

- Long term data management
- Digital Assistents

### > IKT as Innovation driver for

- Mobility, Car
- Health, Media
- Energy-Efficiencies, Smart Grid
- Payment, Cards, SIM Evolution

### > Infrastrukturentwicklung und Schlüsseltechnologien

- Infrastructures
- Security
- Cloud Communications
- Smart Space, Devices, Displays
- m2m

## Operater Challenges

### > MNO future

- NetCo vs ServeCo?
- M-NO:(mobile & fix) internet ?

You will shape the digital Society  
with your Knowledge

Make it happen

#### Author:

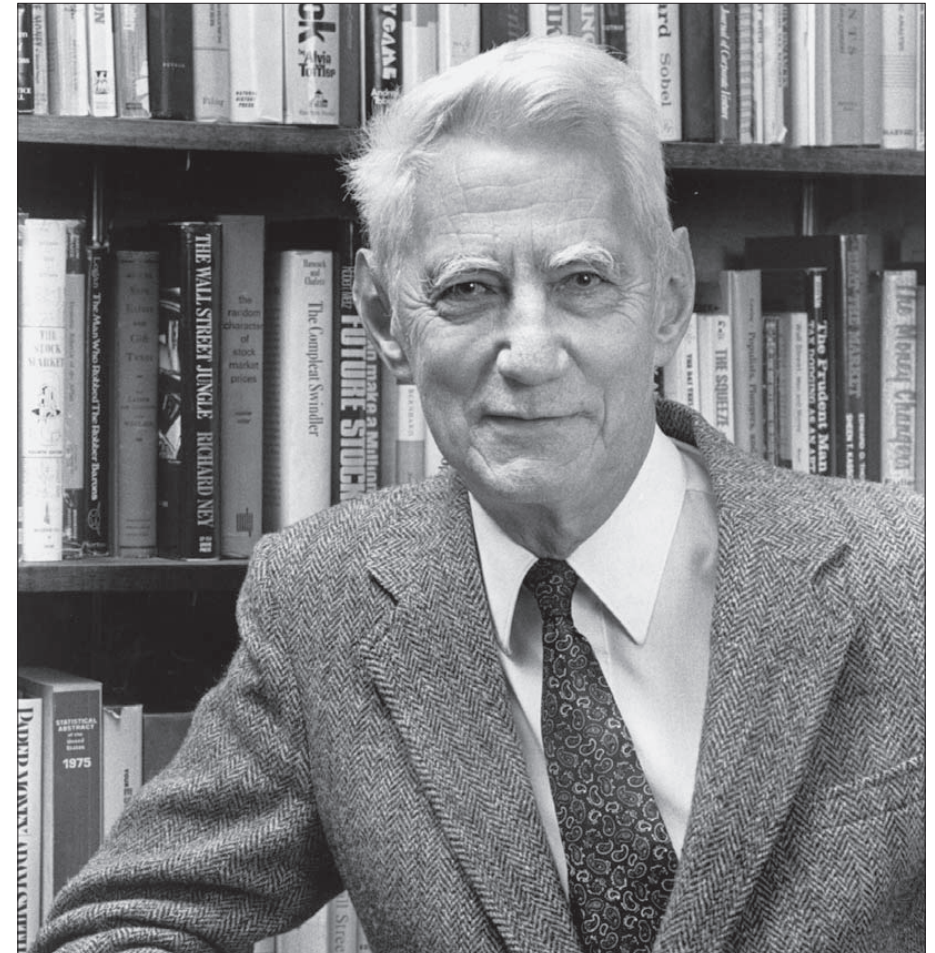
Dr. Bernd Wiemann

Vodafone Group Research & Development, Munich, Germany

bernd.wiemann@vodafone.com

## CLAUDE SHANNON – JUGGLER OF SCIENCE

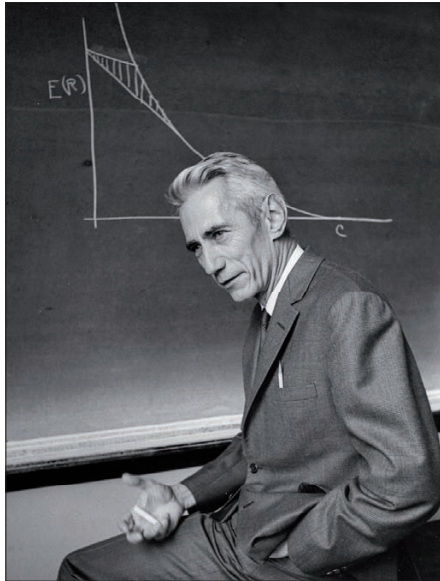
*Jochen Viehoff*



Claude Elwood Shannon



Born in 1916 in Petoskey, Michigan



The Manhattan Rare Book Company

1030 Second Ave., Gallery 938  
New York, NY 10022  
Tel: 212-328-8007 Fax: 212-355-4403  
email: info@manhattanrarebooks.com

Science/Technology/Medicine Literature/Modern First American History/Travel Art/Visual/Children's

home | new acquisitions | receive a catalog

THE FOUNDING DOCUMENT OF INFORMATION THEORY

SHANNON, CLAUDE.  
**A Mathematical Theory of Communication**

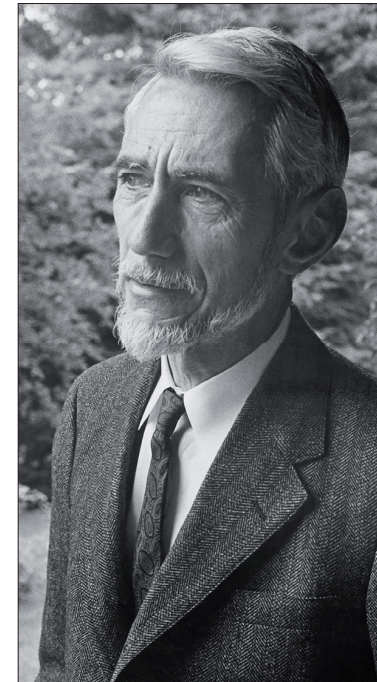
*"Probably no single work in this century has more profoundly altered man's understanding of communication than C.E. Shannon's article, 'A mathematical theory of communication.'"*  
-D. Stepien, *Bell Labs*

FIRST EDITION of Shannon's extremely influential theory of communication and essential to the development of the computer. Virtually all electronic forms of communication today are indebted to Shannon's work.

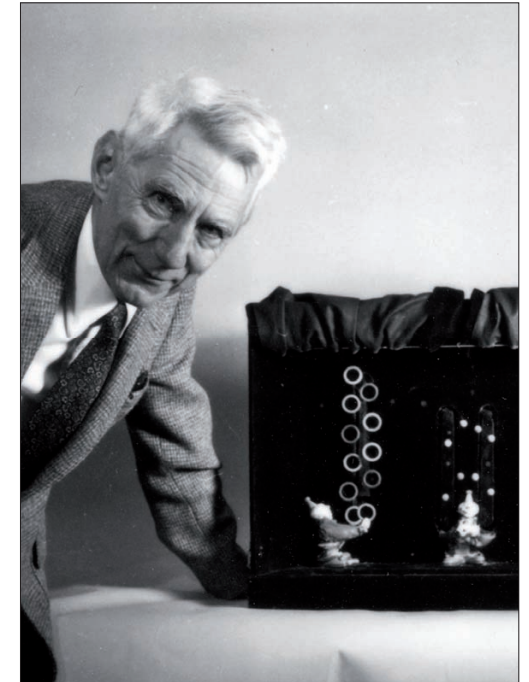
"In 1948, Dr. Shannon published his masterpiece, 'A Mathematical Theory of Communication,' giving birth to the science called information theory. The motivation again was practical: how to transmit messages while keeping them from becoming garbled by noise. To analyze this problem properly, he realized, he had to come up with a precise definition of information, a dauntingly slippery concept. The information content of a message, he proposed, has nothing to do with its content but simply with the number of 1's and 0's that it takes to transmit it. This was a jarring notion to a generation of engineers who were accustomed to thinking of communication in terms of sending electromagnetic waves down a wire. 'Nobody had come close to this idea before,' Dr. Gallager said. 'This was not something somebody else would have done for a very long time. The overarching lesson was that the nature of the message did not matter — it could be numbers, words, music, video. Ultimately it was all just 1's and 0's. 'Today, when gigabytes of movie trailers, Napster files and e-mail messages course through the same wires as telephone calls, the idea seems almost elemental. But it has its roots in Dr. Shannon's paper, which may contain the first published occurrence of the word 'bit.' (New York Times, obit, 27 Feb, 2001).

\*American mathematician Claude Shannon developed information theory by 1948. He reduced the notion of information to a series of yes/no choices, which could be presented by a binary code. Each choice, or piece of information, he called a 'bit.' In this way, complex information could be organized according to strict mathematical principles. His methods, although devised in the context of engineering and technology, were soon seen to have applications not only to computer design but to virtually every subject in which language was important, such as linguistics, psychology, cryptography, and phonetics; further applications were possible in any area where the transmission of information in any form was important' (Mount and List, *Milstones*, 65; *Dictionary of Scientists*, 436).

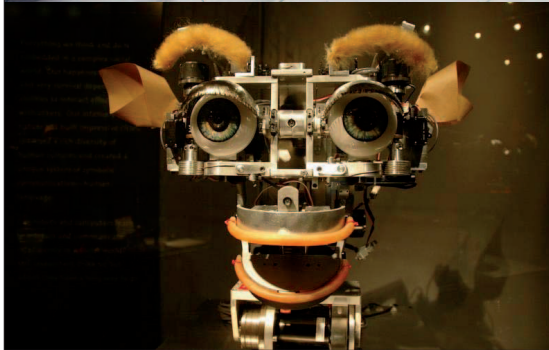
First edition of both parts: In: The Bell System Technical Journal, Volume XXVII, No. 3 & 4, p.379-423 (part I) & p.623-656 (part II), N.Y., 1948. The whole volume offered. Octavo, contemporary blue library cloth. Fine condition. \$3400.



24. February 2001



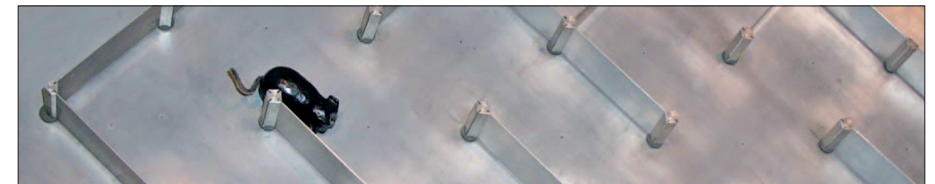
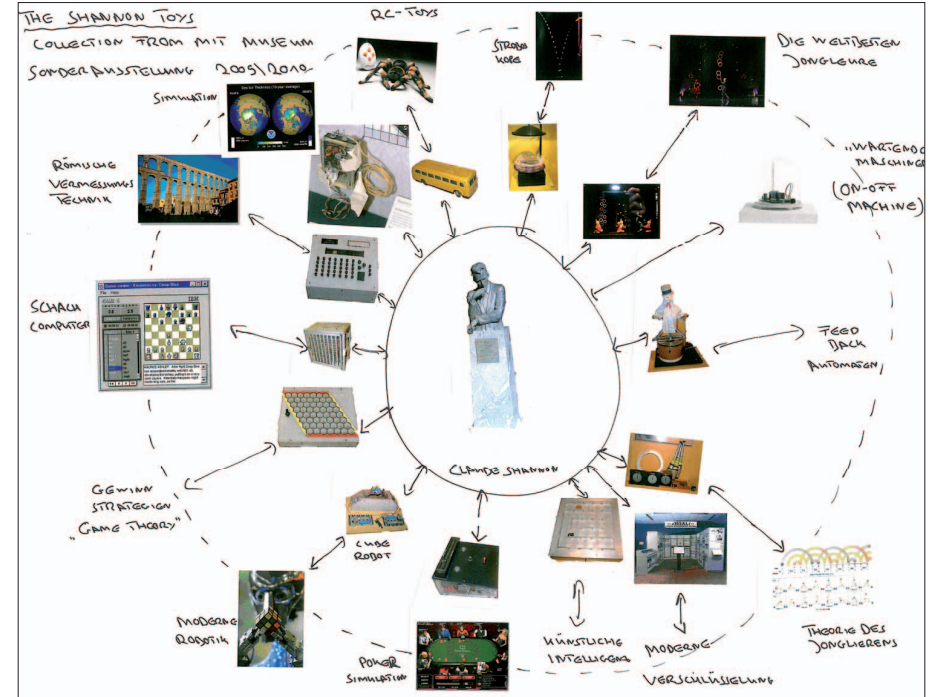
Shannon the gadgeteer



Massachusetts Institute of Technology  
MIT MuseumBuilding N51 265  
Massachusetts Avenue Cambridge  
MA 02139



MIT Museum, Cambridge, Juni 2008

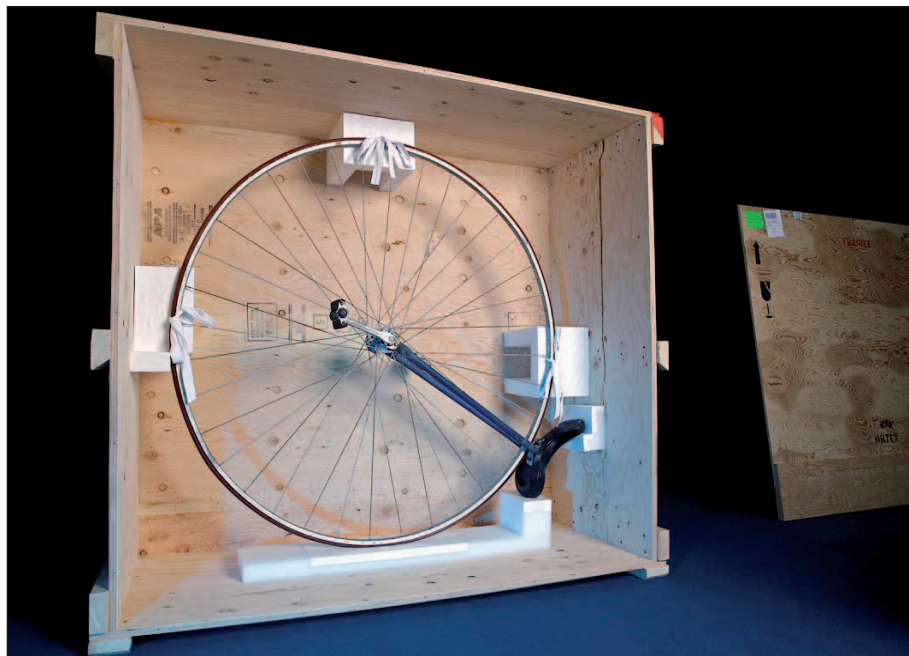
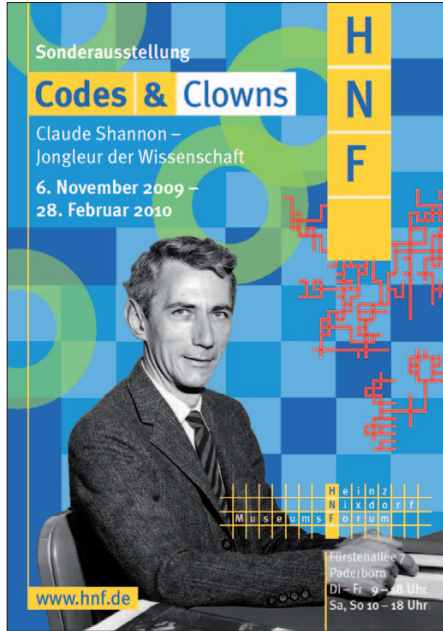


**Shannon Toys**  
The Collection from the MIT Museum

Floorspace 500 m<sup>2</sup>  
 Period 5th November 2009 / 1th March 2010  
 Team HNF Norbert Ryska, Jochen Viehoff, Stefan Stein  
 Contact [jviehoff@hnf.de](mailto:jviehoff@hnf.de)  
 Team MIT Museum John Durand, Deborah Douglas, Ariel Weinberg

„I've spent lots of time on totally useless things.“

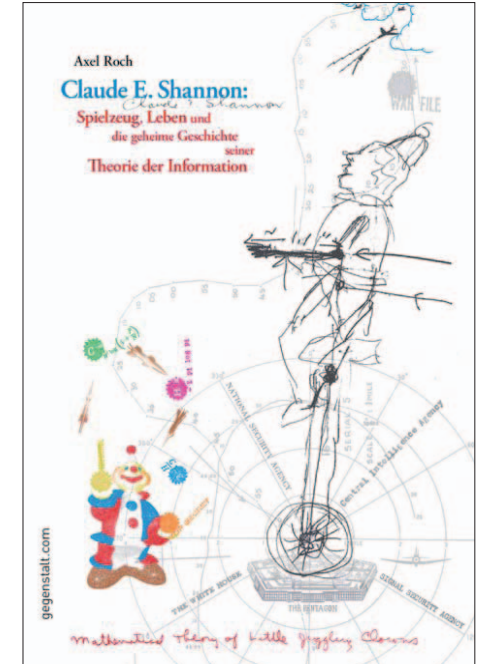




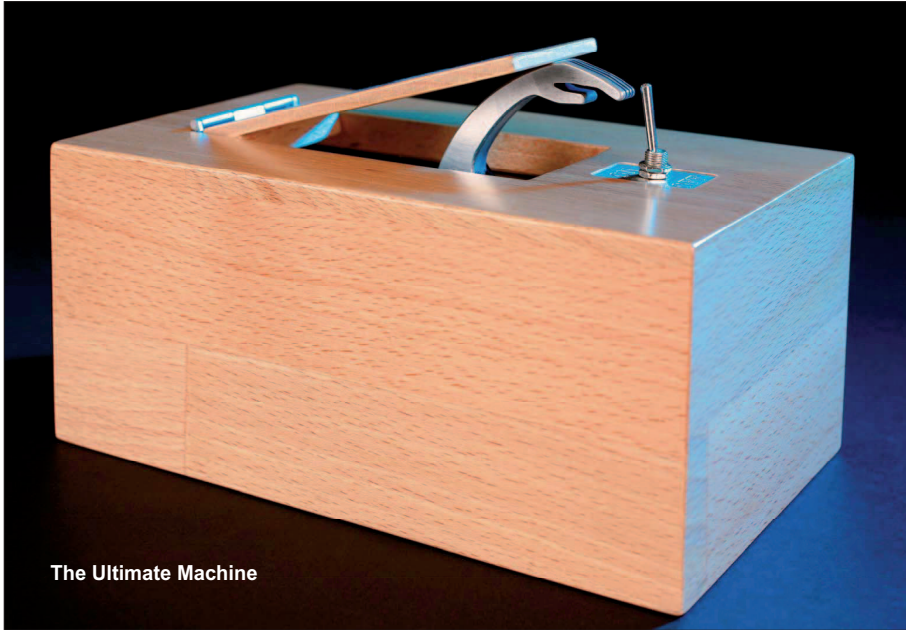
Museum für Kommunikation, Berlin  
Eröffnung am 6. Mai 2010



Ars Electronica Center, Linz, Oktober 2010



<p>Museums <b>H</b>einz <b>N</b>ixdorf <b>F</b>orum</p>		<p><b>H</b>einz <b>N</b>ixdorf <b>F</b>orum</p>	
<p>Vom 6. November 2009 bis 25. April 2010 zeigte das Heinz Nixdorf MuseumsForum in Paderborn eine Ausstellung über Claude Shannon, den Vater des Bits und Wegbereiter des Informationszeitalters. Erstmals in Europa sind die genialen Erfindungen und intelligenten Spielzeuge des begeisterten Bastlers, Jongleurs und Einradfahrers aus dem MIT Museum zu sehen.</p>		<p><b>HNF</b> Heinz Nixdorf MuseumsForum GmbH Fürstenallee 7 33102 Paderborn Telefon 05251-306-600 Telefax 05251-306-609 www.hnf.de</p>	
<p><b>Inhalt</b></p> <ul style="list-style-type: none"> <li>□ <b>Biografie</b> Leben und Werk von Claude Shannon</li> <li>□ <b>Kurzfilm</b> Eine Einführung in die Ausstellung</li> <li>□ <b>Ausstellung</b> Ein Rundgang mit 14 Stationen</li> <li>□ <b>Eröffnung</b> Pressekonzferenz und Rede von Peggy Shannon</li> </ul>		<p>Redaktion: Norbert Ryka, Dr. Jochen Viehoff Produktion: Michaela Wecker Sprecher: Christian Berg</p> <p>© Heinz Nixdorf MuseumsForum, 2010</p> <p>Das Heinz Nixdorf MuseumsForum wird getragen durch die von Heinz Nixdorf gegründete <b>Stiftung Westfalen</b>. Diese fördert vorrangig Wissenschaft und Lehre, insbesondere auf dem Gebiet der Informationstechnik.</p>	
<p><b>Codes &amp; Clowns</b></p>		<p><b>Codes &amp; Clowns</b></p> <p>Claude Shannon – Jongleur der Wissenschaft</p> <p><b>Codes &amp; Clowns</b></p> <p>Claude Shannon – Jongleur der Wissenschaft</p> <p>Video-DVD 60 Min., deutsch</p>	

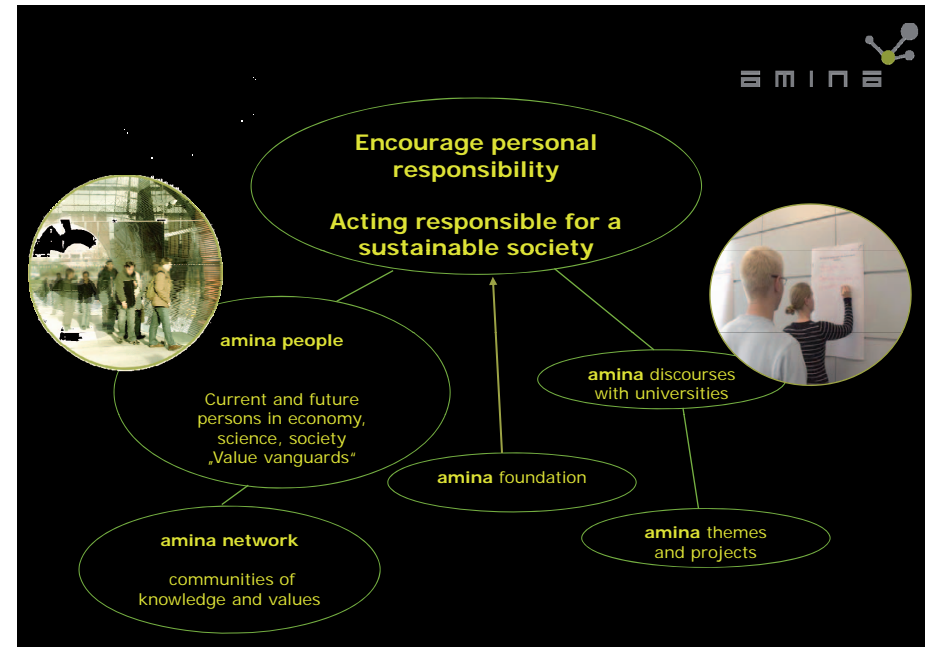


The Ultimate Machine

**Author:**  
Jochen Viehoff  
Heinz Nixdorf Museums-Forum, Paderborn, Germany  
jochen.viehoff@hnf.de

## ETHICS & SUSTAINABILITY – NECESSARY CROSS-SECTIONAL SKILLS FOR SCIENTISTS AND ENGINEERS

*Christian Rauch*





Can we achieve a better understanding for our work and its impact in inter- and transdisciplinary collaboration?

> Discussion with the auditorium

How can we early recognise consequences of new products and technologies?

> Discussion with the auditorium

How can ethics become a matter close to our heart?

> Discussion with the auditorium



Some impressions  
from our work in the amina foundation...




Moderated discourses...  
...what values do we have?



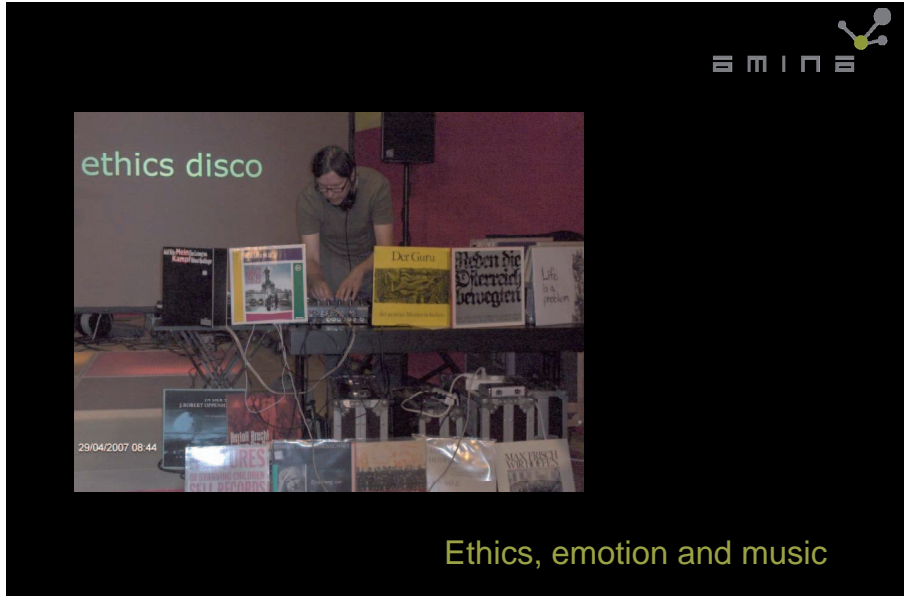

Energy coach

Role-play for  
managerial  
responsibility

Future-oriented projects  
with students




Workshops to influence  
educational processes and curricula



Contact us

- **amina** Stiftung für ethisches Unternehmertum und verantwortliches Wirtschaften in Europa
- [www.amina-stiftung.de](http://www.amina-stiftung.de)


**Author:**  
 Christian Rauch  
 anima Stiftung Berlin, Germany  
[info@amina-stiftung.de](mailto:info@amina-stiftung.de)  
[www.anima-stiftung.de](http://www.anima-stiftung.de)

## THE INFLUENCE OF INDUSTRIAL ASSOCIATIONS ON THE DEVELOPMENT OF THE MODERN MEDIA SOCIETY

*Vincent Chan*

1. Universal network access
  - a. Ubiquitous
  - b. Affordable by all
  - c. Uncensored
2. Beneficial services and applications
3. Privacy and security

1. **"Global Network: Prospects for the Future,"** New Photonics **Technologies for the Information Age**, Artech House Optoelectronics Library, 2004
2. **"Communication satellites - technologies and systems: Telecommunications Systems and Technologies,"** edited by Paolo Bellavista, in Encyclopedia of Life Support Systems (EOLSS), developed under the auspices of the **United Nations Educational, Scientific and Cultural Organization (UNESCO)**, Eolss Publishers, Oxford, UK, <http://www.eolss.net>, 2007
3. **"In the Public Interest,"** Report of the ad hoc faculty committee on access to and disclosure of scientific information, MIT 2005
4. **"Telerradiology: Extravangance or Necessity?,"** Third **International Conference on Image Management and Communication** (Invited), pp. 127 – 130, Berlin, Germany, June 1993.



**IN THE PUBLIC INTEREST**

**REPORT OF  
THE AD HOC FACULTY COMMITTEE  
ON ACCESS TO AND DISCLOSURE OF  
SCIENTIFIC INFORMATION**

**Massachusetts  
Institute of Technology**

Appointed by the Provost and the Chair of the Faculty

**COMMITTEE**

*Vincent W. S. Chan*  
Joan and Irwin Jacobs Professor of Electrical Engineering & Computer Science  
Professor, Aeronautics & Astronautics  
Director, Laboratory for Information and Decision Systems

*Jerome I. Friedman*  
Institute Professor, and Professor of Physics

*Stephen C. Graves*  
Abraham J. Siegel Professor of Management  
Chair of the Faculty

*Harvey M. Sapolsky*  
Professor, Political Science  
Director, MIT Security Studies Program

*Sheila E. Widnall, Chair*  
Institute Professor, and Professor of Aeronautics and Astronautics

1. Timely open access by all to industry funded research
2. Prevent "under the table" deals
3. IP accessible on fair basis

## Yes, engineers and social scientists must work together

1. Design network to be affordable and accessible by all
2. Develop beneficial applications and services
3. Protect information and privacy within the law

A universally accessible, affordable and secure network is the best social equalizer and provides a level playing field for all

**Author:**  
 Prof. Vincent W. S. Chan, PhD  
 Joan and Erwin Jacobs Professor of Electrical Engineering and Computer Science  
 Claude E. Shannon Communication and Network Group  
 MIT Cambridge, USA  
 chan@mit.edu

## THE INFLUENCE OF INDUSTRIAL ASSOCIATIONS ON THE DEVELOPMENT OF THE MODERN MEDIA SOCIETY

Perspectives of the Global mobile suppliers association (GSA)

*Alan Hadden*

**What is a trade association?**



**One definition:**

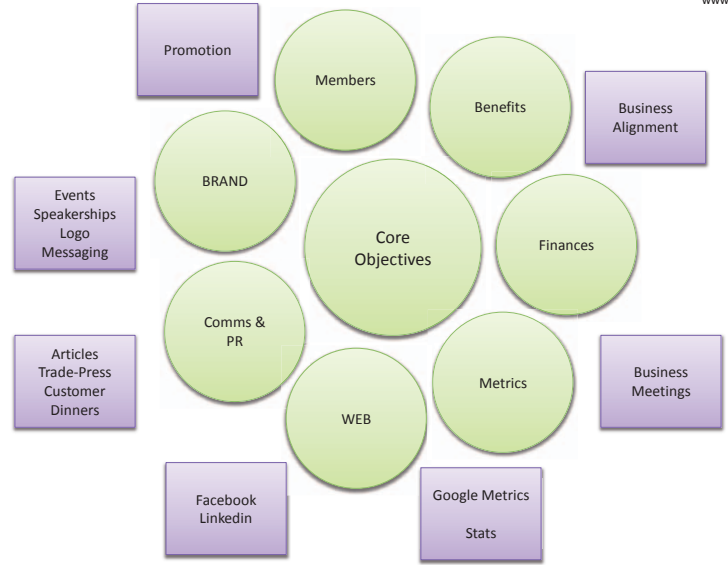
*An industry trade group, also known as a trade association, is an organization founded and funded by businesses that operate in a specific industry. An industry trade association participates in public relations activities such as advertising, education, political donations, lobbying and publishing, but its main focus is collaboration between companies, or standardization. Associations may offer other services, such as producing conferences, networking or charitable events or offering classes or educational materials. Many associations are non-profit organizations governed by bylaws and directed by officers who are also members*



www.gsacom.com

**Objectives are central**

□ Members drive the objectives



www.gsacom.com

### Example: Global mobile Suppliers Association (GSA)



www.gsacom.com

- ❑ Established in October 1998
- ❑ Membership comprises suppliers from the mobile communications industry
  - ❑ Executive Committee: Aeroflex, Ericsson, Nokia Siemens Networks, Qualcomm, Telcordia
- ❑ Not-for-profit organisation, legal entity subject to Swiss Law
- ❑ Basic activities are funded by membership subscriptions
- ❑ Administration/financial management in UK
- ❑ Objectives, procedures, governance, rules, voting arrangements, election of officials, etc. set out in Articles of Association

### GSA's Objectives



www.gsacom.com

#### Objectives

To strengthen the promotion of GSM/EDGE/WCDMA-HSPA, Evolved HSPA (HSPA+) and LTE/SAE world-wide in new and existing markets

To promote the evolution of GSM as the platform for delivery of third generation (3G) multimedia services enabled by WCDMA-HSPA, Evolved HSPA (HSPA+) and LTE/SAE

### Results

#### Example: Brazil



www.gsacom.com

**Ensure Brazil did not become isolated through regulatory decisions – including spectrum assignments - that would disengage its citizens from global markets, economies of scale, roaming opportunities etc.**

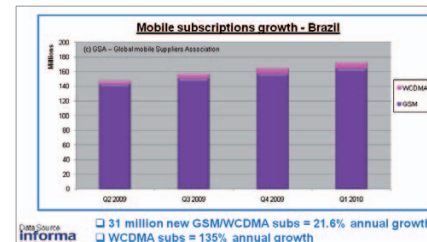
- ❑ Promote GSM (an open standard) and its evolution path to 3G, global markets, international roaming opportunities
- ❑ Show and explain with trusted facts about industry achievements, milestones, commitments encouraging Brazil to also participate
- ❑ Call for the best regulatory conditions for market development
- ❑ Call for alignment with international standards (GSM/3GPP) and international spectrum allocations
- ❑ Work together with other relevant trade associations and industry groups, including the European Commission, the GSM Association, UMTS Forum: develop common messages, provide supporting facts and evidence, etc.
- ❑ Actions complemented activities of member organizations

### Results

#### Latin America mobile market: Q1 2010



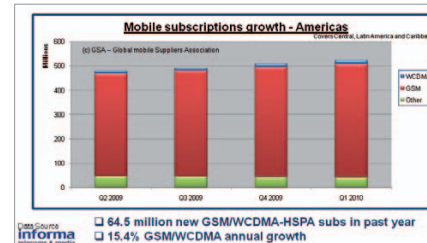
www.gsacom.com



Brazil regulatory policy allowed for the establishment of GSM in the country

Other Latin America countries took their lead from Brazil ensuring the region is an integral member of the global mobile market

Brazil and other Latin American countries have established very successful GSM businesses: many operators have evolved to WCDMA-HSPA mobile broadband



### Results

#### Example: India



www.gsacom.com

**Ensure India fully exploited the opportunities for its citizens and businesses from deployments of GSM**

- ❑ India was amongst the first regions outside Europe to embrace the GSM system
- ❑ An alternative cellular technology was establishing itself in the market coupled with aggressive marketing
- ❑ The benefits and opportunities arising from the global spread of GSM needed to be better explained and promoted
- ❑ GSA organized major seminars in New Delhi (seat of government, regulatory authorities, press, some mobile operator HQs) and in Mumbai (main business centre – mobile operator HQs, press)
- ❑ Actions complemented activities of member organizations
- ❑ Work together with other relevant trade associations and industry groups including COAI, TEMA, others to develop common messages, provide supporting facts and evidence, information papers, support lobbying efforts to policy-makers, assist with solutions to assist market developments, etc.
- ❑ Follow-up is important: GSA established an Indian regional Chapter:
  - ❑ GSA member company experts operating in the Indian market worked together to identify necessary actions
  - ❑ backed up by GSA management and other resources
  - ❑ several campaigns developed and successfully executed

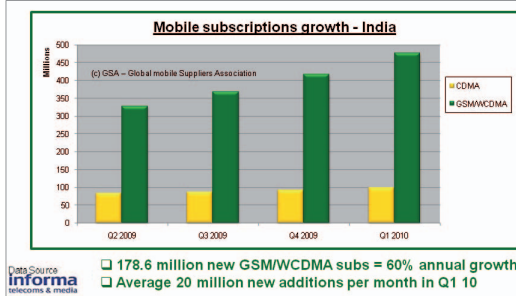
**Results**  
**India mobile market: Q1 2010**



GSM now represents 82.8% of mobile subscriptions

20 million GSM net additions every month makes India the fastest developing market in the world

3G mobile broadband systems are available and will be massively boosted on conclusion of the 3G spectrum auction



**Results**  
**Example: Technology promotion – GSM/EDGE**



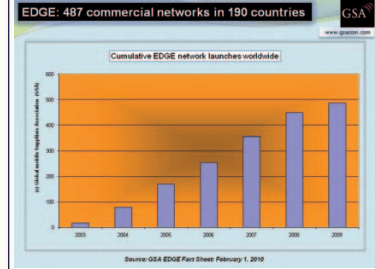
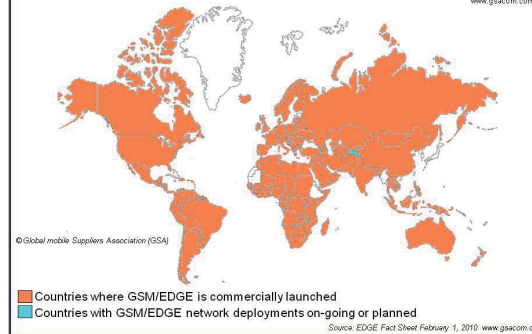
The EDGE Operators' Forum was a highly successful and influential cooperative global industry partnership

- Industry initiative which brought together committed suppliers and committed operators (i.e. evangelists) initially with GSA, then GSMA, followed by 3G Americas
- Supported by leading vendors including Alcatel, Ericsson, Motorola, Nokia, Nortel Networks, and Siemens
- Framework created to focus efforts – the EDGE Operators Forum (EOF), which provided a unique opportunity for interaction between operators and vendors deploying or planning for EDGE as part of their 3G service strategies for evolving 2G wireless systems, based on the global GSM platform
- Initially the EOF operator-led (AT&T); leadership passed to GSA (seminar #4 onwards)
- 12 EOF seminars held between December 2001 – November 2003

**Results**  
**Global success of EDGE**



503 EDGE network operator commitments in 195 countries  
487 EDGE networks launched in 190 countries

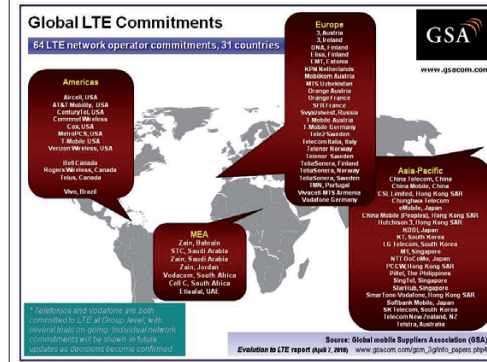
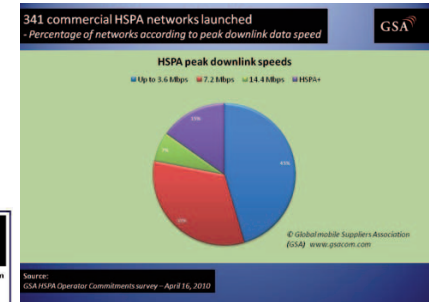


- More than 500 EDGE network commitments worldwide
- 487 EDGE networks commercially launched
- Over 70% of WCDMA-HSPA mobile broadband operators have also launched EDGE for service continuity and the best user experience
- More than 80% of HSPA mobile broadband devices also support EDGE functionality
- Future-proof: EDGE Evolution solutions expected in the market during 2010

**Results**  
**Promoting network evolution and support eco-systems**



- Current activities include:
- WCDMA
  - HSPA
  - HSPA+
  - LTE
  - LTE-Advanced
  - EDGE Evolution
  - Mobile subscriptions growth





## Events

### GSA Mobile Broadband Forum



www.gsacom.com

#### GSA Mobile Broadband Forum – London, September 22, 2009

##### Programme

Mobile broadband update	Alan Hadden, President, GSA
Operator presentation	Professor Ed Candy, Hutchison 3 Group
Mobile broadband – on the way to LTE	Dr Werner Wiedermann, Mobilkom Austria
The Digital Britain Report – what does it mean for spectrum?	Dr Robert Schumann, Analysys Mason
The Two-sided Telecoms Business Models: A \$275 billion Growth Opportunity?	Chris Barraclough, MD & co-founder STL Partners / Telco 2.0™
Mobile Broadband Growth	Martin Ljungberg, Product Manager – Mobile Broadband, Ericsson
Unlocking broadband opportunities	Dina Bartels, Marketing Manager Industry Marketing, Nokia Siemens Networks
Eco-system development	Joe Barrett, Senior Director, Qualcomm

- event organized by GSA
- Focuses on mobile broadband success stories, business models, services, applications, technologies, growing traffic and ARPU, how to prepare the market and market experiences
- Interaction with operators/customers

## Results

### Other current activities



www.gsacom.com

- Assistance/support to operators – continuous dialogue
- Case studies with operators
- Services and applications – e.g. HD voice
- Spectrum including the Digital Dividend
- Mobile broadband success stories – showing how mobile broadband contributes to traffic and revenue growth, increased profitability
- Business models
- Horizontal markets, particularly eHealth, transport
- Input to standardization
- Information papers
- Promotion of thought-leading topics including joint-branded papers with leading players
- Inputs to policy-formation e.g. consultation papers, briefings to regulators, etc.
- Environment – series of papers

## Co-operation



www.gsacom.com

### Co-operation with other bodies

GSMA  
COAI  
ICU  
UMTS Forum  
European Commission  
ITESAP  
ITU  
3GPP  
3G Americas

... and key events organisers e.g. CommunicAsia, ICIN, Informa, IIR, Bharat Exhibitions, Yankee Group, Frost & Sullivan, etc.

## Results

### References



www.gsacom.com

- GSA is now a trusted brand, and a source of consistent, independent data for the industry – particularly for network commitments, deployments, launches and the supporting eco-system including user devices
  - GSM/EDGE, WCDMA-HSPA, HSPA+, LTE
- More than 1,400 media and industry citations/reports in 2009
- Widely referenced by leading vendors and operators in corporate stock market filings, analyst and media briefings, advertorials, white papers, press releases, corporate advertising, customer/partnership meetings
- Referenced by regulators, governments, and leading institutions including CTIA, the European Commission, GSMA, IEEE, ITU, OECD, etc

**Website****– the main communications vehicle**

www.gsacom.com

- [www.gsacom.com](http://www.gsacom.com)
- Topical and up to date*
- Easy to use / navigate / search*
- Registration (to download reports, surveys, information papers, maps, charts, etc.) is a key enabler to confirm the target audiences are being addressed, and to best serve our community*
- RSS newsfeed: [www.gsacom.com/rss/gsanews.php4](http://www.gsacom.com/rss/gsanews.php4)  
generating 100,000 additional page requests/month*
- dotMobi: <http://gsacom.mobi/>*
- Social networking presence important:*
  - GSA Group on LinkedIn: [www.linkedin.com/groups?gid=2313721](http://www.linkedin.com/groups?gid=2313721)*
  - GSA on Twitter: [www.twitter.com/gsacom](http://www.twitter.com/gsacom)*
  - You Tube: [www.youtube.com/GSAMOBILESUPPLIERS](http://www.youtube.com/GSAMOBILESUPPLIERS)*

**Closing remarks**

www.gsacom.com

- Industry associations can have an important relevant role to play in promoting and influencing*
- GSA provides an example of a trade association helping to steer towards the digital society*
- The backing, commitment and active support of leading members is essential*
- Objectives are central; members need to see benefits to justify their investment*
- Deliverables must be accurate, trusted, topical, current and easily obtainable*
- Brand is important*
- Trade associations need to give member organizations a complementary channel to reach key customers, partners and influencers*
- Co-operation with other bodies is often best for optimum results*
- Trade associations need to evolve as industry itself evolves*
- The web is the most cost effective way to confirm how well objectives are being met – and is also the best communications medium*

**Author:**

Alan Hadden, President GSA, UK  
alan.hadden@btinternet.com

**ABSTRACTS & POSTERS**

## Internet glasses and the informational right of self-determination; Are we allowed to do everything we're capable of?

Karoline Bergmann, Frank Ziarno

On the one hand the internet glasses project announces to ease everyday life through instant allocation of relevant information. On the other hand it risks decreasing transparency on the informational right of self-determination when personal data is used.

The central question is: „Are we allowed to do everything we're capable of?“ In this context we clarify „both sides of the coin“ and ask ourselves which positive and negative effects can be expected. We will also ask ourselves whether a strict distinction between relevant and personal information is useful or not.

To answer the questions above, we focus on current developments in the field of wearable computing (e.g. internet glasses) and set the opinions of our fellow men in context. The results of our work are – among other things – based on a survey in the Berlin-Brandenburg area. Therefore we sketch a future scenario which, depending on personal preference, may be either frightening or fantastic.

### Contact:

Karoline Bergmann, B.Eng.  
TH Wildau  
kbergmann@tfh-wildau.de  
Frank Ziarno, B.Eng.  
TH Wildau  
fziarno@tfh-wildau.de

## Internet glasses and the informational right of self-determination Are we allowed to do everything we're capable of?

### Goals and Methods

- determine positive and negative effects when using internet glasses
- determine the context in which people voluntarily disclose personal information
- clarify of whether the attitude to privacy is dependent on peoples own role (source / sink)
- to answer these questions, a survey in the Berlin/Brandenburg area was conducted



### Makes everyday life easier



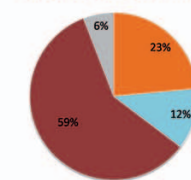
### Decreasing transparency



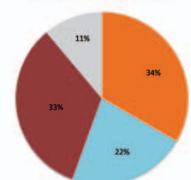
### Assessment of risks and benefits

#### on the example of a healthcare database\*

#### application for insurance



#### use for emergencies



### Results

- Information disclosure is dependent on the context
- Generally, people reject the concept of the retrieval of personal information without the knowledge of the other

## Project Google Street View

Sven Bathke, Dennis Dornbusch, Timo Schmidt

Due to current circumstances this paper deals with the topic „Google Street View“ and the question about the informational self-determination in Germany. Is such a project by Google legally allowed in Germany and do we want this at all?

To answer these questions a survey is carried out in the region Berlin-Brandenburg, which shall also settle the question about the acceptance and the awareness to this topic. First of all this paper will look at the technical aspects and will examine the plans of the U.S. enterprise more deeply. In the further course a philosophical consideration is carried out for the introduction of Google Street View which takes technological conditions, the sociological environment, political conditions and economic changes into consideration. Additionally there will be a brief discussion on the legal aspects.

With these considerations conclusions are drawn and appropriate actions will be recommended.

### Contact:

Sven Bathke, B.Eng.

TH Wildau

svn.bathke@tfh-wildau.de

Dennis Dornbusch, B.Eng.

TH Wildau

dennis.dornbusch@tfh-wildau.de

Timo Schmidt, B.Eng.

TH Wildau

tjschmidt@tfh-wildau.de

# Google Street View and the question about the informational self-determination in Germany

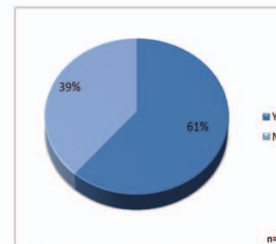
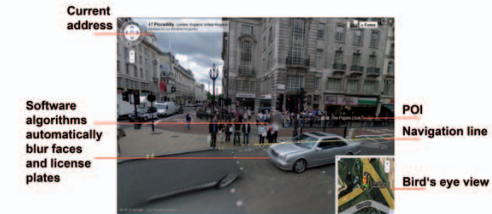
## Goals and Methods

- Detailed look at the technology of Google Street View
- Legal concerns and the informational self-determination in Germany
- Survey on the use and acceptance in the region Berlin-Brandenburg

## Google Street View offers fascinating possibilities based on newest technology

Google Street View is a gigantic project by Google with the aim to make every public road in the world virtually available to drive through. Street View is a part of Google Maps and Google Earth. It allows the user to navigate through the streets of cities and even small villages from a street level perspective. The feature provides the user with a 360° horizontal and 290° vertical panoramic view.

The photos are taken from different vehicles including cars and tricycles. The on-board equipment includes nine directional cameras for the 360° views, a GPS unit for positioning, laser range scanners and 3G/GSM/Wi-Fi - antennas.



Do you think that your privacy is threatened by this service?

## Informational self-determination is important for Germans

Informational self-determination gives every citizen the right to determine the disclosure and processing of his personal data. This is regulated by laws, such as the Federal Data Protection Act ("Bundesdatenschutzgesetz").

### Low trust and the lack of a clear legal position

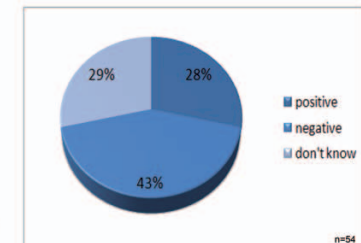
A variety of cities such as Bonn fight against these images from Google. They give their citizens the opportunity to participate in collective declarations against a recording.

A general ban on these recordings is not yet in sight.

## Low trust in Google

The research shows that people in Germany accept Google Street View as a practical modern service. However people are concerned about their privacy taking into account the latest incidents and the resulting bad press.

The fact that Google did not handle the data of users properly in the past, has led to the situation that people don't trust Google anymore.



What is your opinion or attitude towards Google Street View?

## Customer integration as an opportunity to market success in the telecommunications sector

Martin Eras

Because of the worldwide globalisation during the past few years, companies start to develop and offer product-supporting services.

If the customer has the opportunity to decide between two products of the same quality, the buying decision depends on the customer's service perception. For this reason companies are rely on developing custom-tailored services.

This custom-tailored design of concepts can be reached by involving the costum-er and use methods and design tools during the early stage of development. That stage includes the first phase of the service engineering, viz. the generation and evaluation of ideas, as well as the second phase, viz. the requirements analysis.

What has to be considered during the concept design is to confine the complex-ity of the offer in order to not impinge on the buying decision because of overbur-dening the customer.

During the development of a service concept for an innovative product, a ra-dio based broadband internet access realized by the technologies of WiMAX and CDMA2000, all the mentioned guidelines were implemented.

A made study based on two separated groups of probands showed that provided information as well as customer support have to be of high quality in order to con-solidate the customer's buying decision.

Beside this it showed that although the customer prefers an individual service, he or she is not willing to pay more for.

By involving customers in the development process, companies boost the mar-ket success of their products.

### Contact:

Martin Eras, M.Eng.  
TH Wildau  
meras@tfh-wildau.de

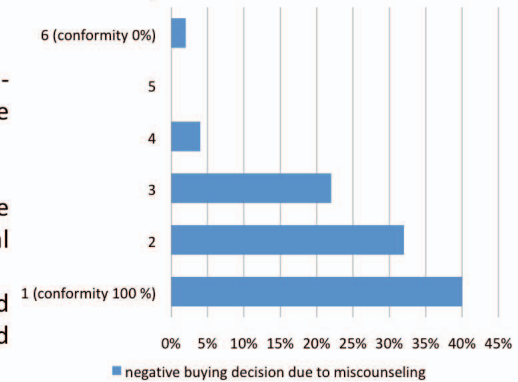
## Market success through a bifocal project by developing customtailored services for the telecommunications sector

Today, customers are more sensitive on product and service quality.

For this reason the developing of custom-tailored services will be crucial for the future success in telecommunications' business.

- Gain useful information about the acceptance process of people regarding technological innovations and service concepts
- Two focus groups of (possible) broadband users are offered a set of different services and quality concepts

### expert advice as a success



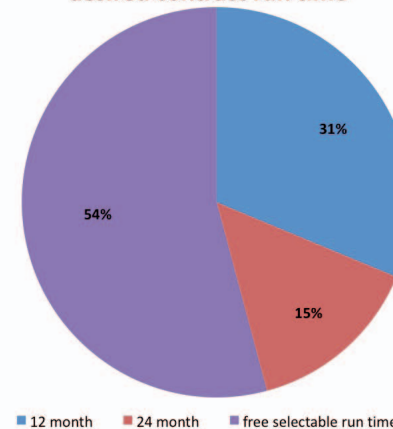
Attention has to be paid on the complexity of the total offering process during the development of the service concepts.

Customers do not want to be overwhelmed by new gadgets

It is always advisable to involve prospective customers in the development process of custom-tailored service products. The collective knowledge of different people supports the fast identification of versatile problem oriented solutions.

The use of internet-based media requires a well structured and customer-friendly information landscape.

### desired contract run time



**The development of custom-tailored services and products is the new upcoming task for ISP's and network providers.**

## LTE – The real mobile Broadband?

Martin Eras, Thomas Zeh

With the introduction of the Internet in the early 90th years of the last century, broadband demand has increased tremendously. As ISDN was the modern technology at that time, which has had its correspondence in the mobile world in the GSM technology, DSL and its evolution has its correspondence in UMTS/3G and its evolution into HSPA (High Speed Packet Access).

Keyword here is LTE (Long Term Evolution). LTE is the next step after HSPA and will be introduced gradually over the next few years. LTE offers more than 100Mbps in downlink and more than 50 Mbps in uplink. This offers the possibility to introduce entirely new services that require much higher data rates.

With even cheaper services and a wider choice of compatible devices, mobile broadband is becoming more and more attractive. Many people use the opportunity today to retrieve information or to interact with the web 2.0 with their 3G device. The mobile broadband offers new possibilities. Any Where, Any Time is the keyword here. Customers are able to retrieve information at any place and any time.

The question that arises, is LTE able to affecting our society more sustainable in telecommunication, media and www? In particular, can LTE be described due its high data rates as the real mobile broadband?

The answer to both questions is, LTE can now be described as the real mobile broadband. With the introduction of LTE, problems such as low data rates by multiple users per cell belong to the past, because of the high data rate with LTE. There would be enough data rate available to provide broadband services for all users. And yes, LTE can also affect our society sustainable. There is already a wide acceptance for mobile broadband services. With the introduction of LTE, more broadband services are coming, and find more customers. This will be affecting our mobile society sustainable.

**Contact:**

Martin Eras, M.Eng.  
 TH Wildau  
 meras@igw.th-wildau.de  
 Thomas Zeh, M.Eng.  
 TH Wildau  
 zeh.th@web.de

# LTE - The real mobile Broadband?

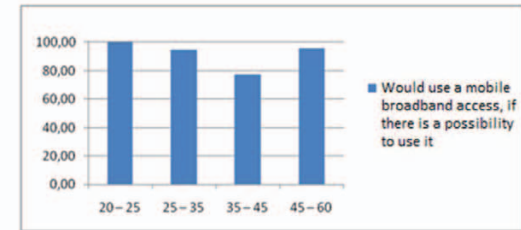
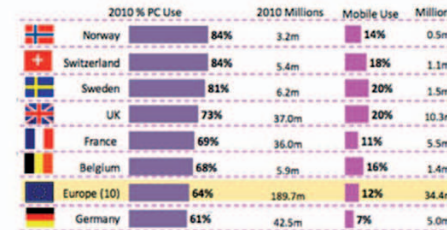
### Questions

Any Where, Any Time?  
 Is LTE able to affecting our society more sustainable in telecommunication, media and www?  
 Can LTE be described due its high data rates as the real mobile broadband?

Mobilfunk-netz	Datenrate
GSM	9,6 kbit/s
AMPS	10 kbit/s
HSCSD	<115 kbit/s
GPRS	<171 kbit/s
EDGE	<473 kbit/s
UMTS	2 Mbit/s
HSDPA	20 Mbit/s
UTRAN/LTE	100 Mbit/s



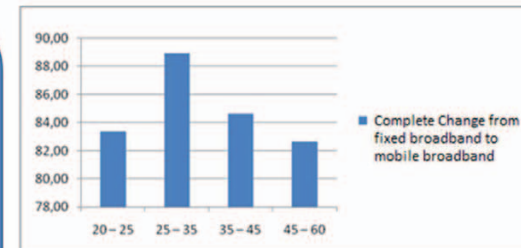
DATENRATEN VON MOBILFUNKNETZEN



With the introduction of LTE, more broadband services are coming, and find more customers.

There is already a wide acceptance for mobile broadband services.

LTE can now be described as the real mobile broadband enough data rate available to provide broadband services for all users



Conclusion: LTE will be affecting our mobile society sustainable

## Symad-mobile

Tony Goldmann

The project Symad-mobile analyzed the possibility of advertising on a mobile phone. A specially-developed idea of the use of the second cell phone displays for advertising, a survey was conducted in the population.

The emphasis was in consideration of acceptance in the population for advertising icons on the phone and in a technically realizable model of the idea.

- mobile-advertising unconscious on the second -

The human perception is considered from the perspective of neuroscience, and is derived from the reduction of representation on company logos. With a sample device, a survey of 60 participants in the european metropolitan region Berlin/ Brandenburg was conducted and evaluated. Compared with an international mobile communications providers in the project Symad-mobile, the price policy of German connection costs has been criticized and pointed to social and technological developments.

- a better way with mobile advertising on the second -

**Contact:**

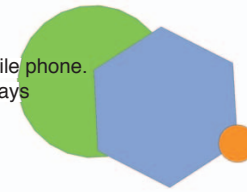
Tony Goldmann, B.Eng.  
 TH Wildau  
 t\_goldmann@gmx.net

## Symad-mobile - suggest advertising on a mobile phone



- an elegant way in the pocket of the customers -

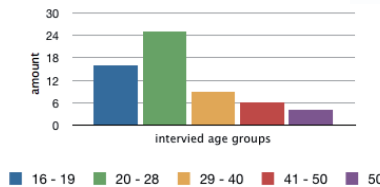
The project Symad-mobile analyzed the possibility of advertising on a mobile phone. A specially-developed idea of the use of the second cell phone displays for advertising, a survey was conducted in the population.



The emphasis was in consideration of acceptance in the population for advertising icons on the phone and in a technically realizable model of the idea.



- mobile-advertising unconscious on the second -



The human perception is considered from the perspective of neuroscience, and is derived from the reduction of representation on company logos. With a sample device, a survey of 60 participants in the european metropolitan region Berlin / Brandenburg was conducted and evaluated. Compared with an international mobile communications providers in the project Symad-mobile, the price policy of German connection costs has been criticized and pointed to social and technological developments.



- a better way with mobile advertising on the second -



## Human-Computer-Interaction (HCI): Perspectives of communication science: appropriation and technological change

Nele Heise

As computer technologies are getting more and more integrated into our environment and individual media sets, HCI becomes important in many parts of our lives. We communicate with other people not exclusively face-to-face, but also through media and computer applications. They serve as tools to get socially connected with others. At the same time, we interact with the technological device itself by using human-computer-interfaces. These interactions are embedded in social contexts, which is why we need to focus on the *social* aspects of HCI. Here, communication studies provide useful approaches that can fundamentally influence the developer's perspectives on *who* the users are and *how* they apply their products. Against this background, we can understand HCI as an active *appropriation process*. In his model of domestication Silverstone describes the ways we integrate media technology into our everyday life (at home, at work etc.). According to him, both parties of HCI, the human and the technological device, are in a constant dialectic of change. As a result, the designs and concepts of the applied technologies are continually changing and adjusting. Following this idea, I modified the domestication cycle by adding aspects of SST-theory and implications of cultural studies research in order to describe social issues of technological change. This advanced model identifies relevant groups and formations (designers, policy makers etc.) in the R&D-process of technologies and influential factors on the side of the user (such as media competence or several social factors). Furthermore, usage of media and technological devices is *context-bound*. Thus, I claim that we need a holistic involvement of the different elements of media and technology use: a triangulation of *text*, *context* and (media)*object*.

### Contact:

Nele Heise, B.A.  
University of Erfurt  
nele.heise@stud.uni-erfurt.de

Mentor: Dr. Julian Gebhardt (University of Potsdam)

## Human-Computer-Interaction (HCI): Communication studies perspectives: appropriation and technological change

### Why HCI?

... since we communicate with other people more and more through media and computer applications, HCI becomes important in many parts of our lives - every interaction with computer devices is somewhat social, embedded in social contexts or a tool to get socially connected with others ... that is why HCI is a matter of social sciences

### Why communication studies?

... concerned with social communication processes or forms of symbolically mediated interaction  
... conceive human beings in their communication activities (interpersonal and/or mediated) as *social* beings

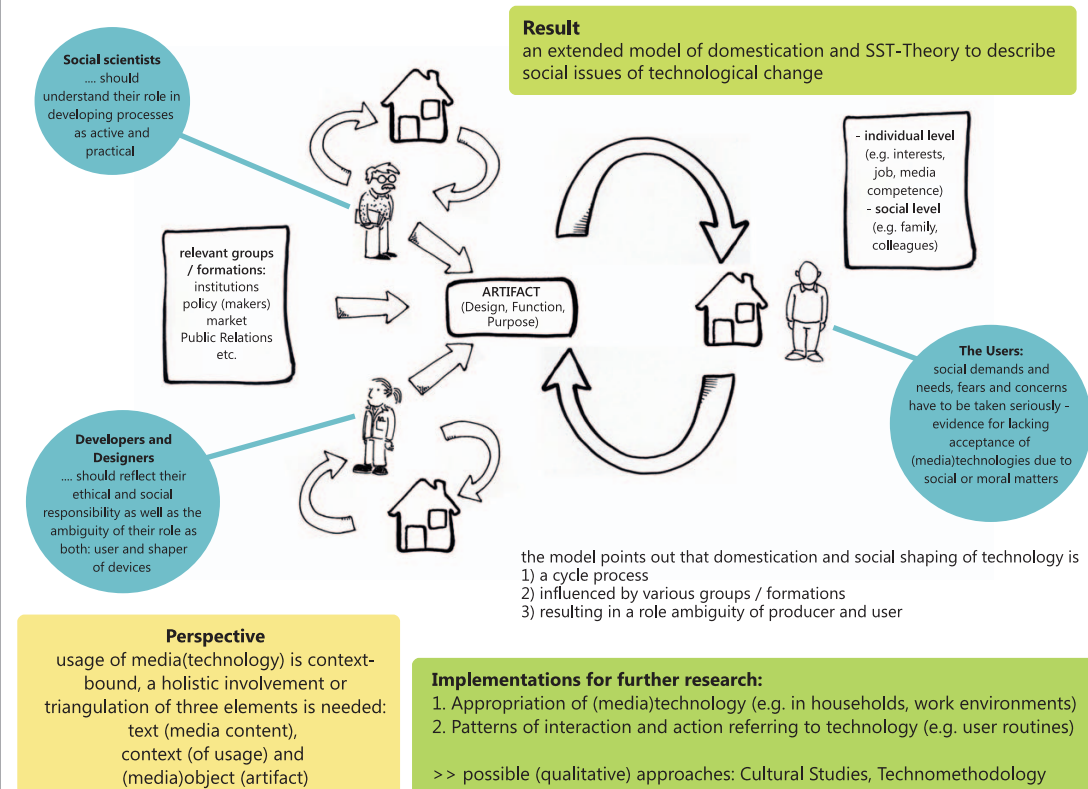
### Theoretical Background

#### Domestication Approach (Silverstone et al.)

... the ways we integrate media technology into our everyday life: both parties of HCI, the human and the technological device, are in a constant dialectic of change - thus, designs and concepts are continually changing and adjusting - phases of this process: commodification/imagination (R&D), appropriation (purchase), objectification (placing), incorporation (integration/routinization), conversion (potential modification)

#### Social Shaping of Technology - SST (MacKenzie & Wajcman)

... various sectors of industry (designers, engineers, marketers, advertisers etc.) combine knowledge, expertise and feedback to present a product to the general public for consumption (customisation or appropriation of the product to suit the consumers individual requirements) - challenges technological determinism, linear processes





## CrashAlerter

*Daniel Schmohl-Linsenbarth, Matthias Rumpf, Christoffer Groß, Martin Schern, Mathias Pape, Wolfgang Price, Tim Raschmann*

Basierend auf der Open-Source Software Plattform Android™ wurde an der Technischen Hochschule Wildau [FH] eine Mobilfunklösung entwickelt, die es ermöglicht automatisch Unfälle anhand »ungewöhnlicher« Akzelerometerdaten zu detektieren.

Einsetzbar ist diese Lösung zur Zeit auf allen gängigen Smartphones mit dem Android OS.

Die Portierung auf andere Betriebssysteme ist geplant.

Wird anhand des Beschleunigungssensors und dem GPS ein Unfall ermittelt, wird zunächst ein lokaler Alarm ausgelöst, der es dem Benutzer erlaubt diesen zu deaktivieren oder manuell Hilfe anzufordern.

Wird auf den lokalen Alarm nicht reagiert, so dass davon auszugehen ist das der Benutzer handlungsunfähig ist, wird von der CrashAlert-Anwendung automatisch eine Notfallstelle benachrichtigt.

Diese Benachrichtigung beinhaltet die relevanten GPS Koordinaten an dem der Unfall ermittelt wurde.

Zur Zeit wird in Kooperation mit dem TÜV Nord ein Test dieser Anwendung geplant um eine möglichst hohe Genauigkeit und Zuverlässigkeit zu erreichen. Denn eine hohe Genauigkeit rettet im Ernstfall Leben.

### Contact:

Daniel Schmohl-Linsenbarth, Matthias Rumpf, Christoffer Groß, Martin Schern, Mathias Pape, Wolfgang Price, Tim Raschmann  
TH Wildau

Technical University of Applied Sciences



# CrashAlerter

„Designed to save your life“

CrashAlerter is an individual, automatic, vehicle-independent solution for detection, locating and signalling of severe traffic accidents for mobile devices.

It is an autonomous, low-cost, freeware solution, independent of vehicle data.

With this given it has the potential of a cheap mass-product for broad levels of the population



fully automated crash alerting solution  
based on the Android™ open source software platform

- ✓ analyze GPS-Data
- ✓ identify „unusual“ accelerometer data
- ✓ Crash information including GPS-Coordinates per SMS to a predefined address

## Digital Resistance: Making Computers Stiff, Scratchy and Stubborn

*Fabian Hemmert*

The current technological trend is to make the ways in which we interact with the digital world smooth, quick and effortless. This talk proposes an alternative: Physical manifestations of the digital world, in ways that require effort to be used.

Why should we make computing more effortful? Which situations can benefit from added strain? In the following, we will present three examples that explore alternative, more resistive ways of interaction.

In the Dynamic Knobs project, we created a button that – electronically – simulates different mechanics and is also controlled by a motor.

For example, taking a photograph is something that should go easy off the finger – it is a frequent, spontaneous action. Sending a text message, at the same time, should be slightly more limited: by leaving the button inside the chassis until the message has been sent, as it makes no sense to push it twice during that time. Thirdly, deleting a phone number by depressing the very same button should take considerably more effort, as it also has more severe consequences.

### Contact:

Fabian Hemmert  
Deutsche Telekom Laboratories  
fabian.hemmert@telekom.de



Video: [http://www.fabianhemmert.de/video/dynamic\\_knobs.mp4](http://www.fabianhemmert.de/video/dynamic_knobs.mp4)

## Communication on general aviation airfields in cases of emergencies

Michael Höynck, Daniel Starke

The incidents of the 11th September 2001 changed the estimation on the level of threat at the European airports. But the activities concerning an increased security on the airports worldwide restricts to the major airports. In Europe the GAA (general aviation airfields) remains nearly unaffected.

In addition to the preventative measures for protection against acts of sabotage or terroristic attacks the communication between the involved institutions plays a major role. The following study analyses assessments from experts and visitors of the workshop discussion 'Business Continuity for Critical Infrastructures' at the airport Schönhagen, 8<sup>th</sup> June 2009.

The including survey describes amongst others their opinions of the topics 'which department should notify the public in cases of emergencies', 'which degree of information should be made public' and 'which media should be preferred to make the information public'. The examination of both survey-sides discloses interesting and partially surprising opinions. Furthermore the study analyse whether a communication standard seems to be a possible conclusion.

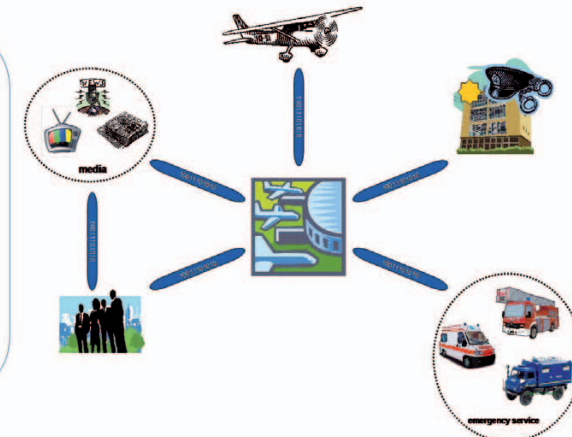
### Contact:

Michael Höynck, B.Eng.  
TH Wildau  
mhoeynck@tfh-wildau.de  
Daniel Starke, B.Eng.  
TH Wildau  
dstarke@tfh-wildau.de

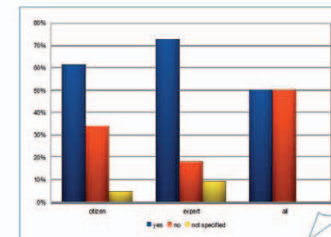
## “ Communication on general aviation air places in cases of emergencies “

### Goals of this study

- Analyzing the information exchange between the involved institutions
- Challenge the operations in cases of emergencies
- Figure out the preferred handling of information and with the media
- Analyzing the practicability of an uniform communication infrastructure
- Compare citizens to experts opinion



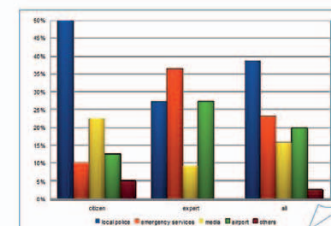
### Do you see some room for improvement regarding the communication on airports?



Regarding the communication on general aviation air places the citizen is rather undetermined. Many of the surveyed people criticized the deficient communication with the populace.

Nearly three-fourths of the experts see potential for improvement on general aviation air places. Especially the information exchange between the involved institutions is still insufficient.

### Which department should notify the public in cases of emergencies?



The research shows that for the citizen the local police station is clearly ranked first. The media follows far behind.

For experts the three departments police, emergency service and airport are neck-and-neck. The media are not an issue.

In summary the local police station should be preferred to inform the public in case of emergencies.

## The influence of electronical games on the mobile phone development and their value for the user.

Dany Janz, Johannes Koslowsky

This research presents the development of mobile games and their influence to the development of underlying technologies. It will take a look at the beginning of the mobile gaming era and the evolution to the current situation. Furthermore it will present possible future developments.

Additionally it will try to give a forecast to what will possibly await us, and the attached value for the user as well as the cultural and ecological aspect. It also allocates the results of a public poll, representing the current user acceptance and what developments the mobile phone and mobile game users would like to see and accept in the future. Especially the acceptance of 3d-Games on mobile platforms is studied.

### Contact:

Dany Janz, B.Eng.

TH Wildau

dany.janz@tfh-wildau.de

Johannes Koslowsky, B.Eng.

TH Wildau

johannes.koslowsky@tfh-wildau.de



# The Influence Of Electronical Games On The Mobile Phone Development And Their Value For The User

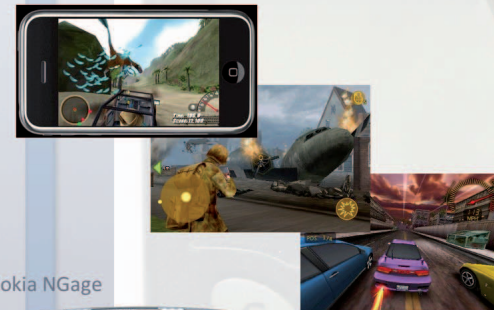
Future

In the last decade, since the publishment of the Nokia 5110, the trend in mobile phone development has gone into the direction of the synthesis between phone and gaming device.

Younger people (under 30) start to tend using their mobile phone for mobile gaming instead of using gaming consoles.

Therefore new technology is developed, like mobile phone graphic accelerators, 3D graphic frameworks for embedded devices and unified reselling platforms for mobile phone apps.

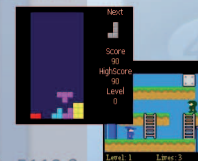
iPhone  
Android  
Open GL ES



Nokia N-Gage



Java Games



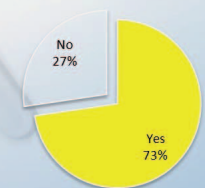
Nokia 5110 & Snake



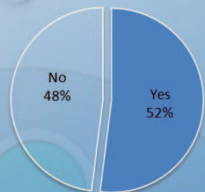
Past

In the beginning mobile phones were designed to serve the need for communication. Over the years mobile phone design changed to serve a lot more needs, especially entertainment and making gaming more comfortable.

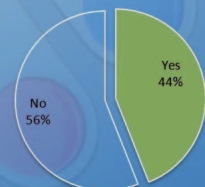
Do you use your mobile phone for mobile gaming?



Would you be interested in 3D games on your mobile phone?



Would you like to have a mobile phone with better graphic performance?



## Case study: Benefits and hazards of the introduction of radio-frequency chips (RFID)

Thomas Kistel

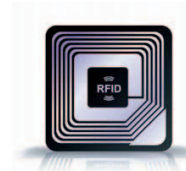
Whatever you read about packaging, supply chains, or identification, you will come across an article or advertisement for Radio Frequency Identification (RFID). According to Microsoft and many other software and logistic companies RFID is evolving as a major technology enabler for identifying and tracking goods and assets around the world. Another outstanding example of the benefit of RFID is the introduction of RFID in library of the University of Applied sciences in Wildau.

In this case study the authors analyzed the history of RFID and the recent use cases of RFID with regard of a comparison of benefits and hazards of the introduction of radio-frequency chips. This study was focused on the application possibilities in the areas logistics, entrée tickets, financial banking and retail shops. The main part of this study was a market survey for the knowledge, usage and data protection questions.

The outcome of the case study underlines the high demand for those radio-frequency solutions. The results of the market survey also shows many reservation regarding privacy concerning of end users, which is one of the most important success factors of RFID.

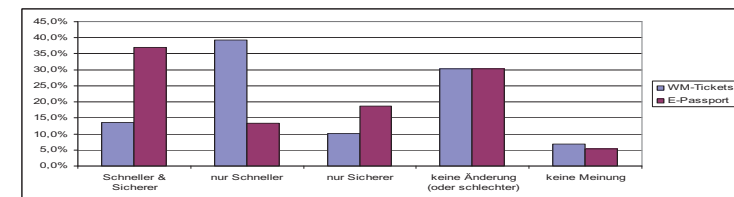
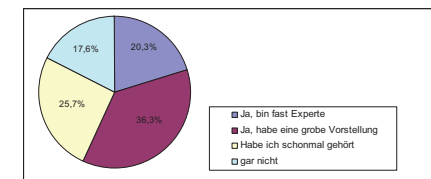
### Contact:

Thomas Kistel, M.Eng.  
TH Wildau  
thomas.kistel@ixellence.com



## Benefits and hazards of the introduction of radio-frequency chips (RFID)

In this case study the authors analyzed the history of RFID and the recent use cases of RFID with regard a comparison of benefits and hazards of the introduction of radio-frequency chips. This study was focused on the application possibilities in the areas logistics, entrée tickets, financial banking and retail shops. The main part of this study was a market survey for the knowledge, usage and data protection questions.



The outcome of the case study underlines the high demand for those radio-frequency solutions. The results of the market survey also shows many reservation regarding privacy concerning of end users, which is one of the most important success factors of RFID.

## Mobile Phone as an Everyday Life-style Object: The move from “plain old mobile” to “electronic brain in your pocket”

Daniela Stärke, Stefan Kramer

In the last 20 years mobile communication became more and more important. In today's life there is nearly no person who has no mobile phone. The use of this accessory changed from simple mobile phone to a huge variety of mobile applications (since the “iPhone” was developed they are called apps), the use of different services provided by the World-Wide-Web and completely new devices.

The key question is: Which direction the evolution will take?

On the one hand there is the classic separation between mobile phones and multimedia devices such as music or video players and on the other hand there are devices which combine these functionalities in one, such as the “iPad”. Based on experiences of mobile phones in today's life where they support people in different ways, like organizers or knowledge bases the question towards the “electronic brain in your pocket” is: In which way mobile services will gain influence on private data. There are particular possibilities to connect different kinds of private data to a larger database that gives more detailed information about the user.

Customer's acceptance of devices towards multimedia applications for example mobile TV, ebooks and audio books and mobile Internet is investigated in this paper. For this purpose surveys are conducted in Berlin-Brandenburg to get a serious database and to figure out customer's wishes and expectations regarding these services. Another reason for this survey is to find out, whether people are willing to provide their private data to programs or services that combine different kinds of those data, to connect these independent data to a huge data base, to make suggestions of peoples interests.

The results will give operators, providers and suppliers a closer view into their customers' ambitions and handling on data mining processes in an open communication world.

### Contact:

Daniela Stärke, B.Eng.

TH Wildau

daniela.staerke@tfh-wildau.de

Stefan Kramer, B.Eng.

TH Wildau

stefan.kramer@tfh-wildau.de

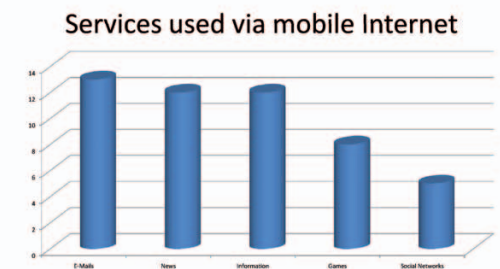
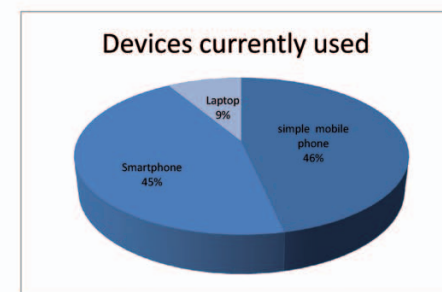
## Mobile Phone as an Everyday Life-style Object

The move from “plain old mobile” to “electronic brain in your pocket”

### Where is the mobile phone going to?



### What do people think about mobile services and devices?



### Will this be the future of usage?

- Result 1:** Popularity of mobile Internet increases.
- Result 2:** People want to have devices with increasing functionality.
- Result 3:** People are not willing to release their private data.

- Hypothesis 1:** People would use their mobile phone for financial transactions.
- Hypothesis 2:** People want to stay in contact with other anytime and anywhere.

## Filmic Representations of Human Computer Interaction in Games

Gesa Ruge

Apart from the aesthetic influences that film and games have on each other there are several motion pictures which deal with the act of playing a video or computer game itself. These fictional works reflect on the cultural technique of interacting with a computer and also on the nature of virtuality and games. By means of a neo-formalistic analysis my master thesis researches how this is aesthetically staged and how it effects the narration. Both the cinema motion pictures TRON and EXISTENZ as well as the machinima series THE AWAKENING deal with characters who immerse into game environments.

The aesthetic composition of the latter can be related to the times of the artworks' releases. While TRON showed visionary digital game graphics in 1982 which weren't used in PC games until a decade later, 1999 the organic aesthetics of EXISTENZ reflected biotechnological possibilities that are still science fiction. In THE AWAKENING on the other hand footage from an existing computer game was used. This is fundamental to the art form machinima which was already popular in 2005. As can be shown not all of the game environments are to be easily considered as virtual worlds within the frame of reference the respective diegesis provides. An important question in this respect seems to be whether actions are symbolic or not and how the logic of cause and effect is structured. Related to this is the interaction and communication between the film characters which can be roughly divided into game players, game characters including avatars and representatives of the computer itself.

These topics continue to be discussed in the media of fictional motion pictures. In BEN X (2007) the protagonist makes sense of his everyday world by applying the rules of a computer game to it. The relation between player and avatar has been addressed as recently as December 2009 when AVATAR was released.

My poster is based upon my master thesis "Zur Inszenierung von Computerspielen im Film. Eine Analyse von TRON, EXISTENZ and THE AWAKENING", Bochum 2008, supervised by Prof. Dr. Astrid Deuber-Mankowsky.

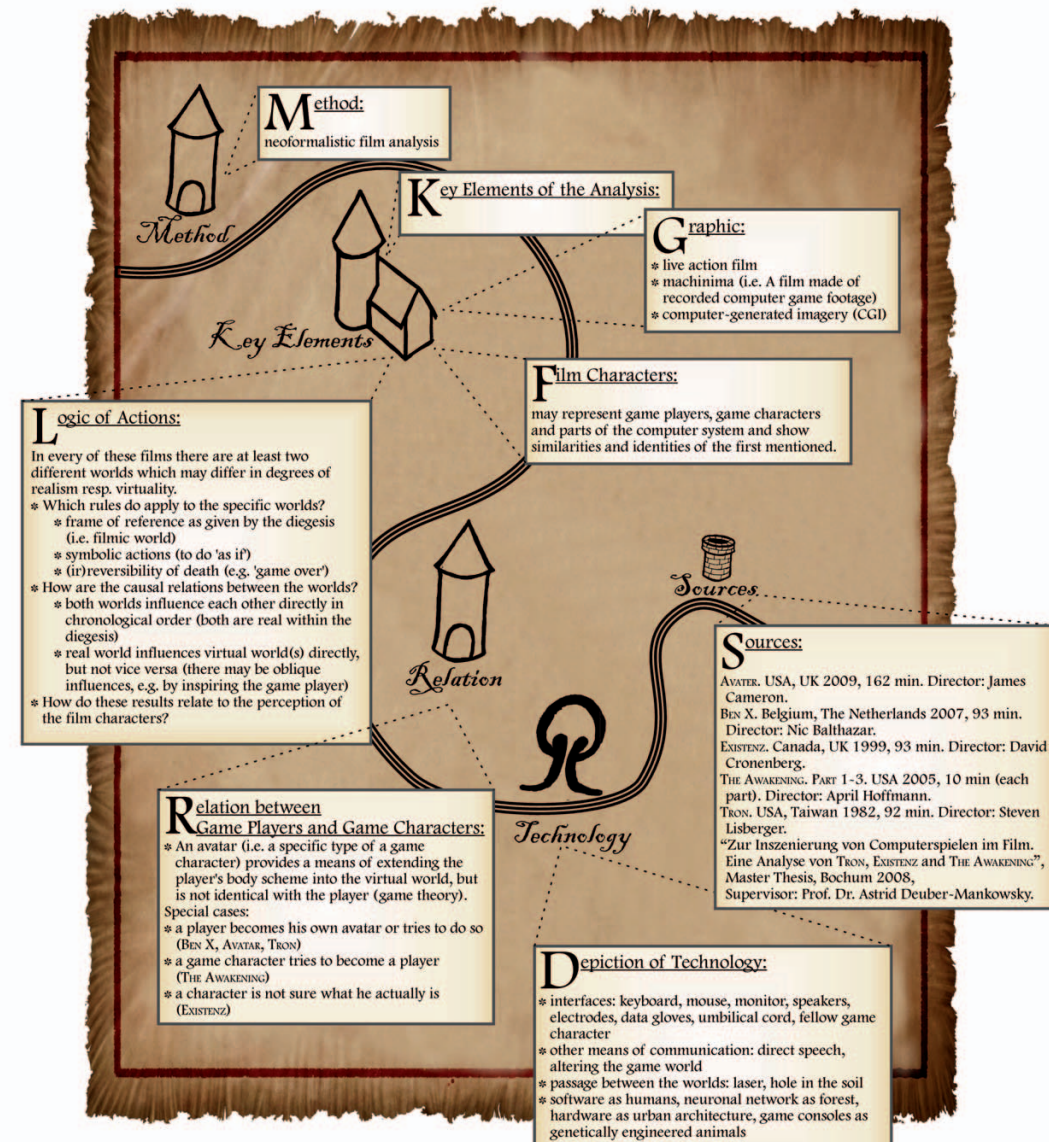
### Contact:

Gesa Ruge, M.A.

Ruhr-Universität Bochum

gesa.ruge@ruhr-uni-bochum.de

# Filmic Representations of Human Computer Interaction in Games



## StreetLab: Co-Designing ICT Concepts with Children and Teenagers

Alexander Müller, Tom Bieling, Jan Lindenberg, Gesche Joost

In an experimental and human-centered design approach we seek to understand the real needs and uses of mobile phones and services in today's young urban context. To enable the research about authentic experiences in every day live, we "moved" the laboratory onto the street, thereby combining a semi controlled environment with a situation of permanent field research. Thus, our aim was loosen the borders between laboratory and field research as an experimental hybrid approach.

In view of growing diversification and the multi ethnic urban society in the global context, we focus our research on heterogenic urban neighborhoods. We look on how to employ mobile ICT to facilitate creativity, understanding and social/environmental sustainability.

### Contact:

Gesche Joost  
Deutsche Telekom Laboratories  
gesche.joost@telekom.de

# StreetLab: Co-Designing ICT Concepts with Children and Teenagers

Alexander Müller, Tom Bieling, Jan Lindenberg, Gesche Joost

### Abstract

In an experimental and human-centered design approach we seek to understand the real needs and uses of mobile phones and services in today's young urban context. To enable the research about authentic experiences in every day live, we "moved" the laboratory onto the street, thereby combining a semi controlled environment with a situation of permanent field research. Thus, our aim was loosen the borders between laboratory and field research as an experimental hybrid approach.

In view of growing diversification and the multi ethnic urban society in the global context, we focus our research on heterogenic urban neighborhoods. We look on how to employ mobile ICT to facilitate creativity, understanding and social/environmental sustainability.

### Participatory Design Methods





The methods of our project/study is based on a qualitative research paradigm. We attempt to comprehend the subject and its subjective constructed world holistically. The method is based on the perspective of the children and teenagers (Flick, 1995) and their assignment of meaning that result from daily experiences, events and interactions. Particularly in the context of ICT this manner of observation is suitable. We observed the participants in their familiar environment and thus we could naturally detect and analyze the daily processes of communication.

Specific to qualitative research is the impartiality that emerges when it comes to theory construction. Instead of preformulating hypotheses and theoretical assumptions these are evolved during the research process.

- How does ICT influence the daily life of children and teenagers?
- How do children and teenagers communicate in their social environment?
- What are the needs and wishes for ICT of children and teenagers?
- How could future ICT products and services look like?

Participatory and design specific methods are employing surprising, provocation and associating moments. So they unfold an uncommon view to a general life by using the creative potential of the children and teenagers. They become co-designers and we consider them as experts of their everyday life.

Our workshops were oriented to the following steps:

Sensitization	Making	Reflection	Analysis
At first the participants are lead through a playful or "jumbocollage" processes the informative sensitization into the particular topic of the workshops.	Through "Making" of "jumbocollage" processes the participants can objectify their thoughts, needs and visions.	In discussions, presentations and through performative scenarios, solutions are questioned and workshop results are reflected.	The design researchers systematically analyse their own participatory observation and the participants' outcomes.
			

### Research Topics

The project consists of the combined interests in multiple and diverse research fields, e.g.:

- Social and Inclusive Design (Tom Bieling)
- Embodied and Playful Interaction (Alexander Müller, Fabian Hammett)
- Sustainable and Environmental Design (Jan Lindenberg)

The research has mainly been carried out in different semi-structured workshops, each of them focusing on combinations of the above mentioned topics.

### Hands-On Workshop Examples

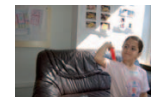
Within the duration of one month, more than 20 different workshops were organized. The workshop topics resembled our diverse research interests and ranged from issues of privacy, security and sharing, education and learning, entertainment and creativity to topics like cultural identification, perception, language and communication.

Workshop: Secret Communication

In this workshop the participants developed new concepts for secret messaging. Those ideas were presented with paper prototypes by simulating the scenario



The written text is digitized by a special pen.



Through a "Talking-Geskin" the text is transmitted to the other pen.



On a display the message is shown.

Workshop: Free Style Music



Probes and things you love, always by your side. Most on your body, communication is necessary. A workshop light becomes essential!

Workshop: Traumhandy



A prototype outcome from the "Traumhandy" workshop by Heini, 12 Years...

### Outcomes

Together with more than 100 Children and Teenagers we collected ideas, concepts and prototypes for future Information Communication Technology, devices and services. In addition we collected visual (e.g. Photo-collages), auditory (e.g. sound collages) and audio-visual (e.g. Interviews, video-documentary) insights concerning the needs and usage of mobile ICT by teenagers and young adults from different social and cultural backgrounds, as well as rituals and habits in an urban and diversified context. These insights have been helping us, to understand today's young people's perception of life and interaction.

Some of the key insights we gained so far, were:

- For children and teenagers the mobile phone already is a fundamental and essential device in their everyday communication.
- Mobile device shall store and play a wide range of media.
- "Do it yourself!" by using ICT as a tool for creativity.
- Sharing data is already standard and will become more important.
- Better possibilities for personalization are desired.
- Identification with the device is a key parameter.
- Technical competence amongst young adults is standard.

### Outlook

After closing the doors of StreetLab in October 2009, we start developing concepts for services, products and further collaborations based on the learnings with the children and teenagers from various cultural backgrounds living in Berlin-Neukölln.

### Literature cited

Boehner, K., Dourish, P., Sengers, P., Boehner, K. *How HCI Interprets the Probes*, in CHI 2007 Proceedings.  
 Flick, U., 1995, *Qualitative Forschung – Theorie, Methoden, Anwendungen in Psychologie und Sozialwissenschaften*, Rowohlt Taschenbuchverlag GmbH, Reinbeck bei Hamburg.  
 Gaver, B., Dunne, T., and Preece, E., 1999, *Cultural Probes*, *Interactions* 6, 1 (Jan. 1999)  
 Sanders, E., 2002, *From User-Centered to Participatory Design Approaches*, in FRASCARA, J. (Ed.): *Design and the Social Sciences*, Taylor and Francis.

### Acknowledgments

First of all we thank all the kids and teenagers that participated in the workshops. We thank the DESIGN RESEARCH LAB (T-Labs) for scientific support. We would further like to thank UDI (T-Labs) and the CREATION CENTER for conducting three of the Workshops.

### For further information

Please contact Gesche.Joost@telekom.de. More information on this and related projects can be obtained at www.streetlab.info. You may also take a look at www.drlab.org





## ACADEMIC FAREWELL

### Bernd Eylert final lesson

*Bernd Eylert*

#### **Magnificences, Excellences, Honourable Guests, Ladies & Gentlemen**

I am very pleased to seeing so many friends from all over the world that have followed the University's and my invitation to this specific day. Finishing my academic career and stepping into my sevens decade of life are reasons enough to celebrate this red letter day.

Please accept that I cannot welcome everyone personally in my last official lesson as a full time professor at this university, but I am going to welcome some of you during my speech.

Secondly, I like to apologise when I am switching between English and German. That has a very serious reason.

First of all I would like to welcome my parents. Very clearly, without them I wouldn't stand here. Both close to the 90<sup>th</sup> of their life they managed to come with the support of my sister and my brother in law, very much welcome as well, from the far west end of our country, the Dutch border, to this place they haven't been before. To be honest, it is a threefold party today, because my parents celebrate their 61<sup>st</sup> wedding anniversary today.

I take this opportunity to welcome my beloved wife Dorothee and my children, Birgit, Maike and Felizitas, with their families, some of them are coming from »overseas« in English terms, meaning East Anglia and Wales. I also would like to welcome by name my oldest friends, Alexa Hirsch, Dr. Kurt Bestehorn and Hans-Peter Kotowski, we keep in touch for more than 40 years, as well as Annelie and Hans Beckmann, Dr. Jürg Ruprecht and Erwin Recktenwald.

During the conference I welcomed a lot of friends from all over the world I've met in my business life. Please accept, when I do not repeat it here again as well as all the other old and new friends and colleagues and ex- and present students who followed my invitation. Last but not least I welcome my »Doktorvater«, supervisor of my doctoral thesis, Prof. Peter Form and his wife, who arrived from Braunschweig today. Your coming is a great honour for me.

Ladies & Gentlemen, my parents gave me the name BERND and I was thinking why. Their reason was easy: I got the name from my grand- and great-grandfather, called Bern(h)ard. But nobody knows me under that name, even myself because I was always called Bernd. But what does it mean? Well, it came to me like a flash: BE is the abbreviation of Bernd Eylert as all know when I'm signing quickly, especially on emails. And then it remains RND. And all native English speakers know RND stands for *Research 'n Development*. What else could I do in my life when it was already given to me into the cradle?!

All my English friends do know: Where ever they go, quite seldom they do have problems with their language. All foreign people seem to speak their mother tongue; no doubt, a very comfortable situation. That wasn't the case in the middle age when scientists spoke Latin and in the 18<sup>th</sup> century the language to speak was French. By the way, it is still the leading language in diplomacy, e. g. in the United Nations, where all documents base on the French version. Later, end of the 19<sup>th</sup> century and up to the 2<sup>nd</sup> WW the leading language in science was German. Places like the universities of Berlin, Göttingen, Heidelberg and others were the brain centres of mathematics, physics and chemistry. In those times my parents grew up and it wasn't common in Germany that pupils did learn next to their local dialect another language than (High-)German. That is the reason why I am continuing now in German to give my parents the chance to follow the lesson and you, good old native English speaking friends, have to content yourself this time with the subtitles. I hope very much you will understand...

Lange habe ich darüber nachgedacht, was ich zum Thema meiner letzten Vorlesung im Amt machen sollte. Ich habe mich dann entschlossen, ein paar Geschichten zur Anwendung der Mathematik im Alltag, vor allem im Tagesgeschäft eines Ingenieurs zu erzählen, wohl wissend, oder auch gerade deshalb, weil ich weiß, dass auch viele Nichtakademiker und vor allem viele Nicht-Mathematiker heut anwesend sind. Das ist eine Herausforderung, die sich mir in der Form noch nicht stellte, ich sie aber zum Schluss meiner akademischen Karriere, auch angesichts dessen, was folgen mag, annehmen will.

## DIE BEDEUTUNG DER MATHEMATIK IM TÄGLICHEN LEBEN EINES INGENIEURS

The Importance of Mathematics in an Engineer's Every Day's Life

*Bernd Eylert*

### Die Geburtsstunde der Mathematik

Gehen wir einfach mal so rund 2600 Jahre zurück. Das Leben der Menschen jener Jahre war vom Lauf der Gestirne geprägt und die wichtigsten Daten waren die Taggleiche im Frühjahr, die den Beginn der Aussaat bestimmte, die Sommer-Sonnenwende, um zu bestimmen, wann die Tage wieder kürzer werden und natürlich das Gegenteil dazu, die Winter-Sonnenwende, die den Menschen wieder Hoffnung auf neues Leben und Wärme versprach. Fürchten taten sich unsere Vorfahren aber besonders vor Naturereignissen, insbesondere, wenn sie am Himmel auftraten, dem ja wohl schon immer große Mystik anhaftete. Am meisten fürchteten sie sich vor einer Sonnenfinsternis, insbesondere, wenn sie plötzlich und unerwartet eintrat, was zu der Zeit üblich war. Die Pilgerfahrten zu Orten der Finsternis begannen erst später und sind auch keine Erfindung unserer Tage! Einer der berühmtesten Philosophen und Mathematiker seiner Zeit war Thales von Milet, einer der sieben Weisen der Antike, den die meisten von uns aus der Schule noch mit dem Thaleskreis in Verbindung bringen. Sie erinnern sich:

Wir malten einen großen Kreis, zeichneten die Diagonale und schrieben Dreiecke ein, deren Eckpunkte auf dem Kreisbogen liegen. Und siehe da, was erhalten wir?

Den **Satz von Thales**: »Alle Dreiecke über der Diagonalen eines Kreises, deren Eckpunkte auf dem Kreisbogen liegen, sind rechtwinklige Dreiecke.«

Eine andere Formulierung besagt: »Der Kreis über der Hypotenuse eines rechtwinkligen Dreiecks heißt Thaleskreis.«

Thales gelang es auch mit der Verhältnisrechnung die Höhe der Pyramiden zu bestimmen. Ihm wird nachgesagt, dass er den Lauf der Sonne und des Mondes über dem Horizont bestimmen konnte. Das brachte ihn letztendlich dazu, als erster eine Sonnenfinsternis vorauszuberechnen. Diese sagte er für den 28. Mai 585 v. Chr. voraus, also heute vor genau 2695 Jahren. Diesen Tag bezeichnen Wissenschaftshistoriker als die Geburtsstunde der (ionischen) Mathematik. Es ist im Übrigen nicht verbürgt, dass er für 2535 Jahre später meinen Geburtstag exakt vorausgesagt hat. Ich hätte es ihm aber durchaus zugetraut...

## Geburtstagsparadoxon

Ich weiß, dass es wenigstens noch einen weiteren Menschen im Raum gibt, der auch heute Geburtstag hat, *Tony Goldmann*. Auch Ihnen und allen anderen, von denen ich es nicht weiß, meinen herzlichen Glückwunsch.

Das gibt mir Gelegenheit, ein zweites mathematisches Thema anzupacken. Es ist berühmt, dem einen oder anderen vielleicht schon bekannt, aber am heutigen Tage durchaus angebracht, weil es eine interessante Anwendung im Ingenieuralltag hat und nicht nur dort. Es gilt die Frage zu beantworten:

*Wie viele Menschen müssen in einem Raum versammelt sein, damit mit 50%-iger Wahrscheinlichkeit zwei von ihnen an einem ganz bestimmten Tag, z. B. heute, am 28. Mai, Geburtstag haben?*

Dazu wollen wir aber erst einmal die Frage klären:

*Wie viele Menschen müssen in einem Raum versammelt sein, damit mit 50%-iger Wahrscheinlichkeit einer von ihnen an einem ganz bestimmten Tag im Jahr Geburtstag hat?*

Die erste Vereinfachung, die wir einführen müssen, ist die Vernachlässigung des 29. Februar. Der tritt ja nur alle vier Jahre auf, es sei denn, wir sind im Jahrhundertwechsel. Ferner wird angenommen, dass die Geburtstage der vielen Personen, die im Raum versammelt sind, die Mathematiker benutzen für solche ganzen natürlichen Zahlen den Buchstaben  $n$ , unabhängige, diskrete gleichverteilte Zufallsvariablen aus einer 365-elementigen Menge sind. Können wir das auch ins Deutsche übersetzen? Probieren wir es mal:

Jeder von Ihnen kennt die Ziehung der Lottozahlen. Dort haben wir 49 Kugeln in einem großen Glasbehälter, alle einzeln durchnummeriert. Aus diesem Glasbehälter, einer sogenannten Urne, werden 6 Kugeln gezogen. Und wenn man als Spieler ganz viel Glück hat, hat man »6 Richtige im Lotto«. Den weiteren Prozess dort lassen wir jetzt mal beiseite.

In unserem Modell haben wir jetzt nicht 49 sondern 365 Kugeln in der Urne, jede mit einem Tag des Jahres bezeichnet, beginnend mit »1. Januar«, »2. Januar«, usf. bis zum »31. Dezember«. Die Geburtstage sind aber unabhängig voneinander, d. h. wir ziehen eine Kugel, gucken auf den Tag, fragen, ob eine/r an diesem Tag Geburtstag hat, ja oder nein, und legen die Kugel dann zurück in die Urne. Man nennt das »Ziehen mit Zurücklegen«.

Unter den getroffenen Annahmen ist die Wahrscheinlichkeit, an einem Tag Geburtstag zu haben

$$P = \frac{1}{365} \approx 0,0027 \cong 0,27\%$$

Die Gegenwahrscheinlichkeit, also die Wahrscheinlichkeit, an einem Tag nicht Geburtstag zu haben, ist damit

$$q = 1 - \frac{1}{365} \approx 0,9973 \cong 99,73\%$$

Bei zwei unabhängigen Versuchen (die Geburtstage zweier Personen werden als unabhängig betrachtet) ist die Wahrscheinlichkeit, *keinen Treffer* zu haben (am bestimmten Tag hat keiner von beiden Geburtstag)  $Q = q^2$ .

Dabei *mindestens einen Treffer* zu haben (mindestens eine Person von zweien hat an einem bestimmten Tag Geburtstag), ist wieder die Gegenwahrscheinlichkeit, also  $P = 1 - q^2$

Allgemein ausgedrückt ist die Wahrscheinlichkeit  $P$ , mit der mindestens eine Person von  $n$  anwesenden Personen an einem bestimmten Tag Geburtstag hat

$$P = 1 - \left(1 - \frac{1}{365}\right)^n$$

Damit lässt sich ausrechnen, wie viele Personen  $n$  man braucht, um eine bestimmte Wahrscheinlichkeit zu erreichen, dass mindestens eine Person an einem bestimmten Tag Geburtstag hat.

$$\left(1 - \frac{1}{365}\right)^n = 1 - P \Leftrightarrow n = \frac{\ln(1 - P)}{\ln\left(1 - \frac{1}{365}\right)}$$

Für eine Wahrscheinlichkeit von 50% benötigt man

$$n \geq \frac{\ln\left(\frac{1}{2}\right)}{\ln\left(\frac{364}{365}\right)} \approx 253 \text{ Teilnehmer.}$$

D. h., statistisch finden wir mit 50%er Wahrscheinlichkeit unter 253 Leuten mindestens eine Person, die an einem ganz bestimmten Tag im Jahr, also z. B. heute, Geburtstag hat.

Jetzt können wir an die eigentliche Frage herangehen:

*Wie viele Menschen müssen in einem Raum versammelt sein müssen, damit mit 50%-iger Wahrscheinlichkeit zwei von ihnen an einem ganz bestimmten Tag im Jahr gemeinsam Geburtstag haben?*

Müssen es mehr sein, oder sind es weniger? Für die, die es nicht kennen, ist es sicherlich spannend zu wissen.

Die Anzahl aller möglichen Fälle, alle Fälle sind gleich wahrscheinlich, ist für  $n$  Personen

$$m = 365^n = \underbrace{365 \cdot 365 \cdot \dots \cdot 365}_{n\text{-mal}} \cdot$$

Für zwei Personen, haben wir vorhin gelernt, ergeben sich  $365^2 = 133225$  mögliche Fälle von Geburtstagskombinationen.

Von diesen möglichen Fällen beinhalten

$$u = 365 \cdot 364 \cdot \dots \cdot (365 - (n-1)) = \frac{365!}{(365-n)!} = \binom{365}{n} \cdot n!$$

nur unterschiedliche Geburtstage. Für die erste Person kann der Geburtstag frei gewählt werden, für die zweite gibt es dann 364 Tage, an denen die erste Person nicht Geburtstag hat etc.

Die Wahrscheinlichkeit dafür, dass alle anwesenden  $n$  Personen an unterschiedlichen Tagen Geburtstag haben, ist folglich

$$\frac{u}{m} = \frac{365!}{(365-n)! \cdot 365^n}.$$

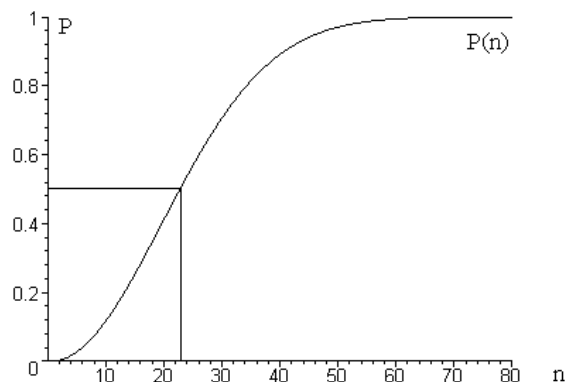
Die Wahrscheinlichkeit für mindestens einen doppelten Geburtstag im Verlauf eines Jahres ist somit

$$P(n) = 1 - \frac{u}{m} = 1 - \frac{365!}{(365-n)! \cdot 365^n} = 1 - \frac{n! \binom{365}{n}}{365^n}$$

Mit der *Stirling-Formel* lässt sich dies gut nähern zu

$$P(n) \approx 1 - \left( \frac{365}{365-n} \right)^{365-n} \cdot e^{-n}$$

Die Frage ist also, wann ist  $P(n) \sim 0,5$ , d. h. 50%? Zeichnen wir die Funktion.



Aus dem Verlauf der Kurve entnehmen wir:

Bei etwa  $P = 0,5$  erhalten wir  $n = 23$ , d. h. bei 23 Leuten finden wir mit 50%-iger Wahrscheinlichkeit einen zweiten Menschen, der am selben Tag Geburtstag hat.

Setzen wir in die Stirlingformel  $n = 23$  ein, dann erhalten wir:

$$P(23) \approx 1 - \left( \frac{365}{365-n} \right)^{365-n} \cdot e^{-23} \approx 0,507 \approx 50\%$$

Das ist doch wohl erstaunlich! 50%-Wahrscheinlichkeit für einen Doppelgeburtstag erreiche ich schon mit 23 Leuten im Raum, während ich 253 Leute brauche, um mit 50%iger Wahrscheinlichkeit eine Person zu finden, die an einem ganz bestimmten Tag im Jahr Geburtstag hat.

Wegen dieses scheinbaren Widerspruchs nennt man das Phänomen *Geburtstagsparadoxon*.

Das ist natürlich nicht nur eine schöne Spielerei und an einem solchen Tag auch passend, sondern dies Geburtstagsparadoxon spielt eine große Rolle in der Kryptologie, also dem mathematischen Zweig der Wissenschaft, der sich mit der Ver- und Entschlüsselung von Nachrichten befasst.

## Verschlüsselung

Nach einigen politischen Ereignissen, ich denke nur an die Starfighter-Affäre der 1960er Jahre oder die Vergabe eines Milliardenkredits der BRD an die DDR in den 1980er Jahren, wo es Journalisten gelang, Gespräche von Politikern abzuhören und mit dem Erfahrenen dieselben öffentlich zu kompromittieren, kam sehr schnell der Wunsch nach Verschlüsselung von Telefongesprächen und mit der Digitalisierung allgemein die Verschlüsselung aller Daten auf. Heut ist Verschlüsselung in aller Munde, egal, ob wir sie in unseren Mobiltelefonen nutzen oder beim Electronic Banking mit TANs und PINs bis hin zu der Verschlüsselung von Fernsehprogrammen, weil die Produzenten damit Geld verdienen wollen. Verschlüsselung ist aus unserem Alltag nicht mehr wegzudenken. Im Gegenteil, es wird unser Leben mehr und mehr bestimmen. Und es ist auch klar, dass es immer wieder Leute geben wird, die ein gewisses Interesse an den verschlüsselten Daten haben, sei es, um Menschen bloßzustellen oder weil sie kriminelle Absichten haben, z. B. Bankdaten zu manipulieren und so an das Geld anderer Leute zu kommen, sei es, dass sie für die »besonderen« Dienste arbeiten. Da sind natürlich die Kryptologen in erster Linie zuhause. Und bis in die 1970er Jahre hinein war dieser Teil der mathematischen Wissenschaft auch nur einem kleinen, elitären Kreis vorbehalten. Es war sogar verboten, nicht nur im Osten sondern auch im Westen, darüber zu reden, wenn man dort involviert war.

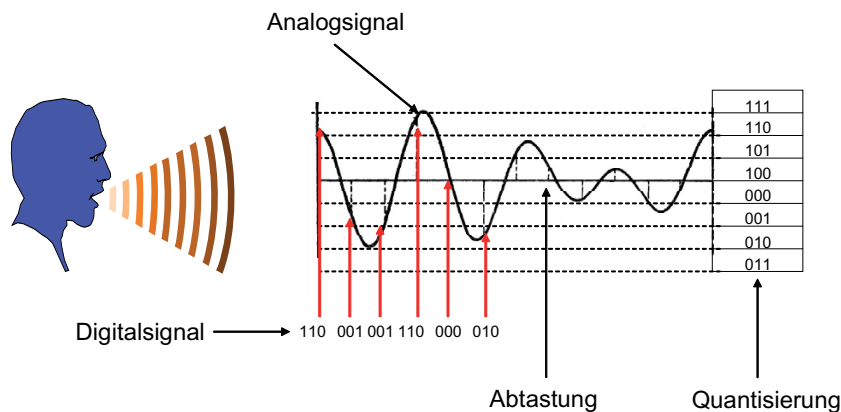
Viele bedeutende Mathematiker haben sich auf diesem Gebiet getummelt, darunter ist der heute schon erwähnte Claude Shannon nur einer, der 1949, vermutlich versehentlich im Bell Systems Theoretical Journal das Papier »The Communication Theory of Secrecy Systems« veröffentlichte. Das änderte sich erst Ende der 1960er-Jahre, als David Kahn sein Buch »The Code Breakers« publizierte und besonders Anfang der 1970er-Jahre, als der österreichische Mathematiker Horst Feistel in einer IBM Publikation den nach ihm benannten Algorithmus vorstellte, der dann im Digital Encryption Standard (DES) seine erste Anwendung fand und publiziert wurde. Das waren die ersten öffentlichen Arbeiten 20 Jahre nach Claude Shannons Paper aus dem Jahr 1949 zum Thema »Geheime Botschaften«.

Ich will jetzt hier keine Vorlesung über IT-Sicherheit halten, obwohl mir diese immer großen Spaß gemacht hat, aber ich möchte das Vorhin Gesagte in einen Kontext bringen. Dazu muss ich allerdings ein wenig ausholen.

Zunächst einmal müssen wir den Begriff *Bit* einführen. Ein Bit ist nicht nur das berühmte und wohlschmeckende Kaltgetränk! Nach dessen ausreichendem Genuss dürfte das Rechnen ein wenig schwerfallen. Nein, den Begriff »Bit« hat unser Urvater der Informationstheorie, Claude Shannon, geprägt. Übrigens, auch Claude Shannon war gelernter Mathematiker und hat sehr viel mehr daraus gemacht. Bit steht für **B**inary **d**igit, also Binär- oder Dual-Zeichen, dargestellt durch 0 und 1, und ist damit auch die kleinste Informationseinheit.

Als nächstes stellen Sie sich einmal vor, Sie sprechen in ein Mikrofon, so wie ich es jetzt tue. Schallwellen werden 1:1 in elektrische Signale umgewandelt, was wie folgt aussieht:

**Analog/Digital-Wandlung**



Ein solches Signal kann man natürlich übertragen und hat man das jahrzehntelang auch erfolgreich getan, aber es ist sehr schwer, Analogsignale zu verschlüsseln. Da sind die Ingenieure auf die Idee gekommen, allen voran wieder unser Urvater, Claude Shannon, nicht mehr alle Signale zu übertragen, sondern nur ganz bestimmte Teile. Dazu benutzt man einen Quantisierer und ordnet dem Analogsignal einen binären Zahlenwert zu. D. h., man liest eine bestimmte Länge der Nachricht in einen Speicher ein, tastet anschließend das Analogsignal in gleichmäßigen Schritten ab und ordnet jedem einzelnen Abtastwert die entsprechende 1-0-Folge zu. Anschließend wird nur noch die 1-0-Folge, hier also:

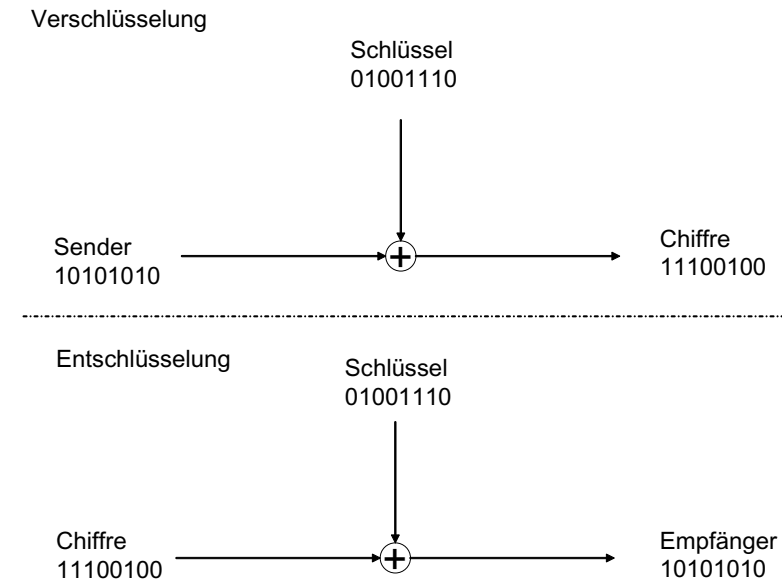
110 001 001 110 000 010... übertragen.

Auf der Empfängerseite geht der Prozess genau umgekehrt vor sich. Das soll uns im Weiteren nicht interessieren.

Für die Verschlüsselung ist das Vorliegen einer solchen 1-0-Folge eine wunderbare Sache. Die Mathematiker haben hier den Ingenieuren ein wunderbares Hilfsmittel an die Hand gegeben. Das Rechnen im Dualsystem ist nämlich ganz einfach. Für unseren Fall brauche ich nur eine ganz einfache mathematische Operation, die Addition. Das macht man mit einer simplen Tabelle:

⊕	0	1
0	0	1
1	1	0

Also wirklich keine Hexerei. Beispiel:



Beachte: Wir addieren stur OHNE Übertrag. Man kann leicht zeigen, dass andernfalls der Übertrag zu nicht korrigierbaren Fehlern führt.

Die Kryptographen, so heißen die Leute, die die Verschlüsselung betreiben, nutzen aus, dass, wie ich eben sagte, die Nachricht in einzelne Signalelemente, sogenannte Blöcke, aufgeteilt ist. Üblicherweise sind diese 64, 128, 256 Bit oder länger. Wir benutzen zur Codierung das Dualsystem, sprich das 2er-System, d. h. wir haben  $2^m$ ,  $m = 64, 128, 256, \dots$  Möglichkeiten der Codierung. Folglich hat ein Kryptanalyst, das ist derjenige, der versucht, einen verschlüsselten Text zu knacken, ebenfalls  $2^m$ ,  $m = 64, 128, 256, \dots$  Möglichkeiten auszuprobieren, bis er eine richtige Lösung findet. Gute Kryptographen wissen es zu vermeiden, aber i. A. zeigen die Nachrichten immer wieder bestimmte Muster auf. Darauf ist der Kryptanalyst fixiert. Er schaut also darauf, wie groß die Wahrscheinlichkeit ist, zwei identische Muster zu finden, aus denen er dann den Schlüssel berechnen kann.

Und hier greift das Geburtstagsparadoxon. Der Kryptanalyst muss gar nicht die  $2^m$ ,  $m = 64, 128, 256, \dots$  Möglichkeiten durchhaken, er ist schon nach  $2^{\frac{m}{2}}$ ,  $m = 64, 128, 256, \dots$  Rechnungen mit (mehr als) 50-iger Wahrscheinlichkeit fertig. Denn unter den  $2^{\frac{m}{2}}$ ,  $m = 64, 128, 256, \dots$  Möglichkeiten gibt es mindestens zwei Blöcke, die identisch sind.

Hier ein Beispiel, um die Größenordnungen zu verstehen, um die es hier geht:

$$2^{64} = 1,84 \cdot 10^{19}$$

$$2^{\frac{64}{2}} = 2^{32} = 4.294.967.296 \approx 4,29 \cdot 10^9$$

Letzteres ist eine um 10 Stellen kleinere Zahl als die erste; ein heutiger PC macht diese Rechnung schon locker in kürzester Zeit.

#### Konsequenz:

Moderne Verschlüsselungsverfahren nutzen Blocklängen von 128 Bit und mehr und Verschlüsselungsalgorithmen nach dem AES-Standard, einem Nachfolger des zuvor schon erwähnten DES-Standards, oder gehen gleich auf die Verwendung elliptischer Kurven.

Dass das ein ganz aktuelles Thema ist, erkennen Sie daran, dass der Bundesgerichtshof (BGH) vor wenigen Wochen entschieden hat, dass jeder Nutzer selbst für die Verschlüsselung seines WLAN-Zugangs verantwortlich ist (Az.: BGH, I ZR 121/08, 12.05.2010). Und wer einen solchen Anschluss hat, weiß, dass er eine Folge von mindestens 20 Zeichen eingeben soll, um sein WLAN wirksam zu schützen. Auch dann ist man gegen Angriffe nicht gefeit, wie ich es selbst erlebt habe, als wir anfangs vergaßen, das WLAN bei Nichtbenutzung auszuschalten. Mir fiel auf, dass das Netz recht langsam war. Daraufhin kontrollierten wir den Zugang und fan-

den, dass sich trotz Verschlüsselung zwei Rechner bei uns eingelockt hatten und auf unserem Zugang herumsurften. Im Internet existieren frei zugängliche Programme und Tabellen, um einen Angriff auf die Passwörter und Schlüssel zu starten. Den (häufig jugendlichen) Angreifern sind meist die rechtlichen Konsequenzen ihres Handelns gar nicht klar. Hier sei zur Erinnerung, und wir haben ja ein paar Juristen an Bord, ein Auszug aus dem Strafgesetzbuch wiedergegeben:

#### § 202a StGB

(1) Wer unbefugt sich oder einem anderen **Zugang zu Daten**, die nicht für ihn bestimmt und die **gegen unberechtigten Zugang besonders gesichert** sind, **unter Überwindung der Zugangssicherung verschafft**, wird mit **Freiheitsstrafe** bis zu drei Jahren oder mit **Geldstrafe** bestraft. ...

#### § 202c StGB

Wer eine **Straftat** nach § 202a oder § 202b **vorbereitet**, indem er **Passwörter oder sonstige Sicherungscodes**, die den **Zugang zu Daten** (§ 202a Abs. 2) ermöglichen, oder **Computerprogramme**, deren **Zweck die Begehung einer solchen Tat** ist, **herstellt**, sich oder einem anderen **verschafft, verkauft**, einem anderen **überlässt, verbreitet** oder sonst **zugänglich macht**, wird mit **Freiheitsstrafe** bis zu einem Jahr oder mit **Geldstrafe** bestraft.

Die Gerichte sind heute, auch bei Jugendlichen, nicht mehr zimperlich. Die Ausrede, ich wollt' doch nur spielen und was ausprobieren, hilft nicht mehr weit.

Ich denke, dieses nochmals herauszustellen, ist auch für Ingenieure und IngenieurstudentInnen wichtig. Unser Tun und Handeln erfolgt stets im gesellschaftlichen Kontext, ein Anlass, warum ich alljährlich das gleichnamige Seminar durchführe und auch diese Konferenz einberufen habe.

#### Funkfeldanalyse

Anknüpfend an unser Thema *Digitalisierung zur Verschlüsselung* möchte ich abschließend noch einen Bereich ansprechen, der es mir im Laufe meines Berufslebens auch besonders angetan hat, obwohl ich ursprünglich gar nicht dorthin tendierte, die *Nachrichtentechnik*. Meine ersten Gehversuche in der Nachrichtentechnik habe ich Ende der 1970er Jahre bei Dr. Joachim Hagenauer, damals DFVLR, und späterem Kollegen und Professor an der Technischen Universität München (TUM) gemacht.

Die Behörden und Organisationen mit Sicherheitsaufgaben (BOS) haben nach dem Krieg im Rahmen der sogenannten »Meterwellen-Funkrichtlinie der DBP« zwei

Frequenzbänder exklusiv zugewiesen bekommen: Den 2- und 4-m Kanal (80 und 160MHz-Bänder). Was es zu der Zeit nicht gab, waren Funkausbreitungsmodelle für diesen Frequenzbereich. Meine Aufgabe war es, geeignete Modelle dafür zu erstellen, um darauf den digitalen Datenfunk zu errichten. Die Mathematik, die man hier vorwiegend braucht, ist vielfältig. Auch hier zeigt sich wieder, der mathematische Werkzeugkasten der Ingenieure muss ziemlich voll und gut sortiert sein.

Will man die Feldstärkeverteilung von Mobilfunkfrequenzen mathematisch beschreiben, bieten sich zunächst einmal Methoden der angewandten Statistik an. Im Laufe der Jahrzehnte wurde eine ganze Reihe von Modellen für die verschiedensten Frequenzbänder erstellt, die sich in der Praxis bewähren mussten und bewährt haben. Vor allem für den öffentlich beweglichen Landfunk wurde da viel auch bei der Deutschen Bundespost getan. Nur für die 80 und 160 MHz-Bereiche gab es nichts.

Ich habe mir den Bereich vorgeknöpft und mit meinem Team ausführliche Messfahrten im Köln-Düsseldorfer Raum durchgeführt. Ellenlange Listen von Messprotokollen mussten aufgenommen und ausgewertet werden. Was sich kaum jemand heute noch vorstellen kann: Die Auswertungen und Berechnungen erfolgten zumeist per Hand und Rechenschieber. Ein einziger erster wissenschaftlicher Taschenrechner, den ich mir damals besorgt hatte, stand i. W. zu Korrekturzwecken zur Verfügung. Mancher mag jetzt verstehen, warum ich so penibel darauf aus bin, dass meine Ingenieur-Studenten Methoden an die Hand bekommen, um die Zuverlässigkeit von modernen Rechenanlagen und Programmen zu überprüfen.

In langwierigen Studien und Messfahrten habe ich herausgefunden, dass die optimale Beschreibung für diese beiden Frequenzbereiche in einem Mix von ländlicher und städtischer Umgebung die *Log-normal-Verteilung* ist. Geprüft wurde das Ganze mit dem  $\chi^2$ -Test.

Nichts im Leben ist umsonst. Irgendwann kommt man auf Bewährtes zurück. So auch hier, als ich in den 1990er Jahren die Arbeiten im 900 MHz-Bereich und dann vor allem die Untersuchungen im 2 GHz-Bereich, den Frequenzbereichen, in denen wir UMTS - mein Baby, wie die meisten wissen – betreiben, fortgesetzt habe.

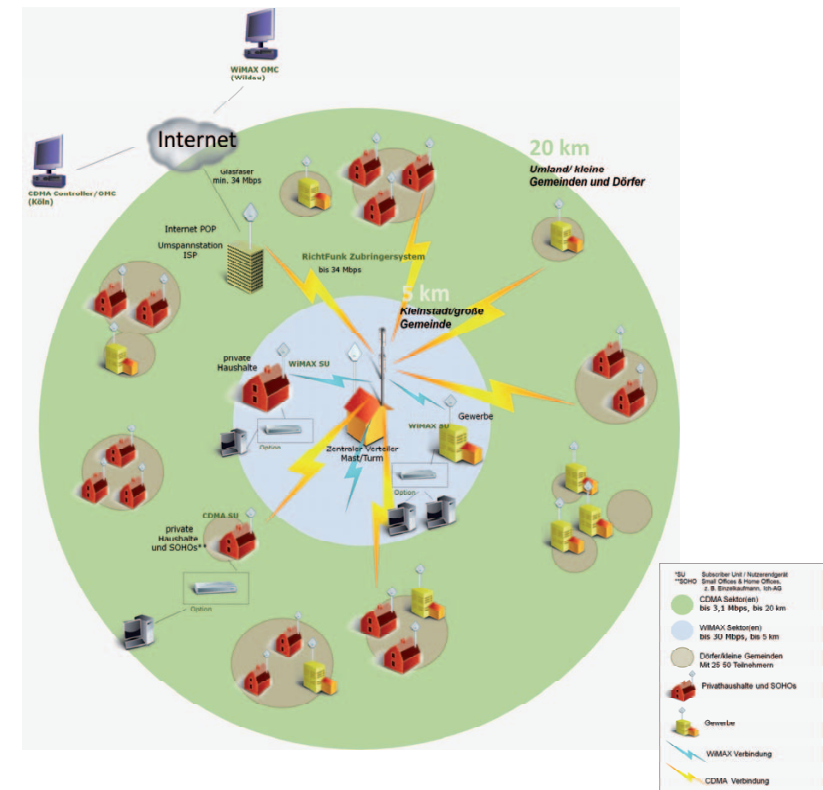
Heute gibt es ein neues, brandaktuelles Thema, und das heißt: *Internetanbindung auf dem Lande*. Ich hab mich diesem Thema schon sehr frühzeitig, vor zwei Jahren, zusammen mit Hartmut Kordus von der adKor GmbH in Wildau, gewidmet. Unsere Idee ist, von nur einem Standort aus eine Kleinstadt oder Großgemeinde auf dem Lande und die wie Satelliten darum herumliegenden kleinen Dörfer mit einer breitbandfähigen Mobilfunkanbindung zu versorgen.

moBilÄR®

mobiler Breitbandinternetanschluss für den ländlichen Raum



Breitband für Brandenburg, Kooperationsprojekt der TFH Wildau, der adKor GmbH und Inquam ermöglicht bis 30 Mbit/s Breitband Service



Zwei effiziente technische Lösungen aus dem Bereich der 3. Mobilfunkgeneration kommen zum Einsatz. CDMA2000 im 450 MHz-Band wird den großflächigen, außerörtlichen Bereich des Versorgungsgebietes (bis zu 20 km mit je Sektor 3,1 Mbps) abdecken, während mit der WIMAX-Technik bei 3,5 GHz der standortnahe, lokale Bereich mit höheren Bandbreiten (bis zu 5 km mit bis zu 30 Mbps) abgedeckt werden kann. Die ausgewählten Mobilfunktechniken CDMA2000 und WIMAX sind ITU-R-Standards (International Telecommunication Union – Radiocommunications) und Mitglieder der sogenannten IMT-2000 3G Family (International Mobile Telecommunications 2000).

Projektlauzeit: 2009 – 2011

Unsere Partner: adKor GmbH



Blieben Sie in Verbindung!

Kontakt:  
Prof. Dr. Bernd Eylert,  
TH Wildau [FH]

Unglücklicherweise sind wir in heftige politische Turbulenzen geraten. Obwohl vom MWFK sowie dem Wirtschaftsministerium Brandenburg genehmigt, haben wir Störfrequenzen aus der Landesbürokratie bekommen, was uns erheblich zurückgeworfen hat. Es gibt einflussreiche Zeitgenossen in Brandenburg, die möchten, dass wir statt des nach Frequenznutzungsplan 2008 für solche Anwendungen ohne Auflagen zugelassenen 450 MHz-Band das Rundfunkband III (174-230 MHz) nutzen. Das Rundfunkband III (174-230 MHz) ist im Rahmen der Digitalisierung des Fernsehens in Berlin und Brandenburg frei geworden und es gibt Leute, die meinen, man könne diese Frequenzen dann einfach anderweitig nutzen. Davor steht aber der Frequenznutzungsplan 2008 der Bundesnetzagentur (BNetzA), der diesen Bereich mit Vorrang dem digitalen Hörfunk zugewiesen hat. Den Landesmedienanstalten werden dafür von der BNetzA nur die dazu notwendigen Kapazitäten, nicht Frequenzen (!), auf Antrag überlassen. Andere Anwendungen lässt der Frequenznutzungsplan eigentlich nicht zu, wodurch eine langfristige wirtschaftliche Nutzung als digitale Dividende verbaut ist. Versuchsfunkgenehmigungen können und sind dazu aber für ein Jahr mit Verlängerung bis zu 3 Jahren genehmigt werden bzw. worden. Es gibt Aussagen, dass der Landesmedienanstalt Berlin/Brandenburg drei Frequenzen für diesen Zweck in Aussicht gestellt worden sind.

Wissenschaftlich ist dieser Frequenzbereich durchaus interessant, weshalb ich mit einem Bachelorstudenten Untersuchungen am Rundfunkband III (174-230 MHz) aufgenommen habe. Wir wollen herausfinden, ob dieser Frequenzbereich ähnlich gut oder gar besser für die Breitband-Weitverkehrsversorgung geeignet wäre, wenn es denn rechtlich möglich ist, als das 450 MHz-Band, was zweifelsfrei für die angestrebte Anwendung benutzt werden darf. Gleiches gilt für das WiMAX-Band. Das 200 MHz-Band ist nun nicht so weit von dem von mir schon mal untersuchten 160 MHz-Band entfernt, weist aber ganz andere Kanaleigenschaften (z. B. 20 KHz vs. 7 MHz) auf und ist damit möglicherweise durchaus für diese Anwendung geeignet. Ich hoffe, dass wir bis zum Herbst schlauer sind und mein Kollege, Prof. Fabig, der das Projekt von mir übernimmt, am Ende auch ökonomisch Interessantes herausfindet.

Ich freue mich auch, dass Frau Abgeordnete Barbara Hackenschmidt, selbst Ingenieurin und Abgeordnete des Kreises Elbe-Elster, wo wir das Projekt durchführen, auch hier ist. Herzlich willkommen. Sie setzt sich energisch dafür ein, dass wir eine für alle sinnvolle Lösung finden. Die Menschen brauchen den Internetzugang. An uns liegt es nicht, ihnen helfen zu wollen.

Lassen Sie mich abschließen mit ein paar Gedanken zu meiner Zeit in Wildau.

Vor sieben Jahren habe ich erstmals den Weg nach Wildau bzw. Berlin eingeschlagen. Damit folgte ich den Spuren eines bei den Mathematikern sehr wohl be-

kannten Landsmanns, der vor rund 150 Jahren diesen Weg beschritt: *Karl Theodor Wilhelm Weierstraß*<sup>1</sup>

Weierstraß wurde am 31. Oktober 1815 in Ostenfelde bei Ennigerloh/Münsterland geboren und verstarb am 19. Februar 1897 in Berlin.

Von 1834 bis 1838 studierte Karl Weierstraß auf Wunsch seines Vaters in Bonn. Er sollte preußischer Verwaltungsbeamter werden. Seine Studiengebiete waren Kameralistik, Rechtswissenschaften und Finanzwesen. Es wird berichtet, er sei ein wenig zu sehr in seinem Corps aufgegangen, einschließlich Mensur und Trinkgelagen und schmiss zum großen Verdruss seines Vaters das Studium. Dieser schickte ihn dann von 1838 bis 1840 an die »königlich theologische und philosophische Akademie Münster« zum Studium der Mathematik und Physik, was seinen Neigungen mehr entsprach. Nach Referendariatszeit und Gymnasiallehrerprüfung lehrte er an verschiedenen Gymnasien in Münster, arbeitete in völliger Isolation von der mathematischen Welt an der Verallgemeinerung der elliptischen Funktionen und publizierte in der Zeitschrift seiner Schule. Aufmerksamkeit erregte aber erst ein Aufsatz in Crelles Journal 1854 *Zur Theorie der Abelschen Funktionen*, dem 1856 eine ausführlichere Arbeit folgte. Da entdeckten ihn Peter Dirichlet und Ernst Kummer, zwei mathematische Größen in Berlin, und zogen ihn zunächst zum Königlichen Gewerbeinstitut, das nach Gründung der Technische Universität Berlin 1879 in diese integriert wurde. Noch im selben Jahr wurde Weierstraß ebdt. zum Professor berufen.

Alle Mathematiker kennen Weierstraß zumindest über zwei wichtige Sätze:

den *Satz von Bolzano-Weierstraß*, der besagt, dass jede beschränkte Folge im  $\mathbb{R}^n$  wenigstens einen Häufungspunkt hat und

den *Weierstraßschen Approximationssatz*, nachdem es zu jeder reellen Zahl  $\varepsilon > 0$  ein Polynom gibt, dass eine vorgegebene Funktion  $f$  in der  $\varepsilon$ -Umgebung approximiert.

Sein Hauptwerk galt der logisch korrekten Fundierung der *Analysis* und der Entwicklung der *Funktionentheorie* auf der Basis der Potenzreihenentwicklungen. Er leistete wichtige Beiträge zur *Theorie der elliptischen Funktionen* – Kernthema der Kryptologie heute –, zur *Differentialgeometrie* und zur *Variationsrechnung*.

Kurzum, Weierstraß' Themengebiete haben mich immer begleitet, seine Arbeiten nie losgelassen, ich will aber nicht sagen, er hat mich verfolgt, eher anders herum, ich durfte seinen Spuren folgen.

<sup>1</sup> Quellen: <http://www.eim.uni-paderborn.de/ueber-die-fakultaet/weierstrass/info-weierstrass.html>, <http://www.wias-berlin.de/about/weierstrass>, [http://de.wikipedia.org/wiki/Karl\\_Weierstraß](http://de.wikipedia.org/wiki/Karl_Weierstraß), <http://www-history.mcs.st-and.ac.uk/Mathematicians/Weierstrass.html>



Dennoch, der Weg hierher war nicht trivial. Über London und Bonn kam ich 2003 mit einem Lehrauftrag zur Mobilkommunikation hier in Wildau an. Mit der Bewerbung auf die gleichnamige Professur und Platz eins auf der Liste war's aber noch lange nicht getan. Wenn Sie als »schwarzer Adler« (Bundesbeamter) zu den »roten Adlern« Brandenburgs wechseln wollen und sollen, ist das trotz Artgleichheit nicht so einfach, wenn Sie auch Ihren eigenen Status halten wollen. Da hat das Bundesrecht schon einige Hürden aufgebaut. Lassen Sie mich deshalb an dieser Stelle vier Leuten ausdrücklich danken, die dies Abenteuer dann doch möglich gemacht haben:

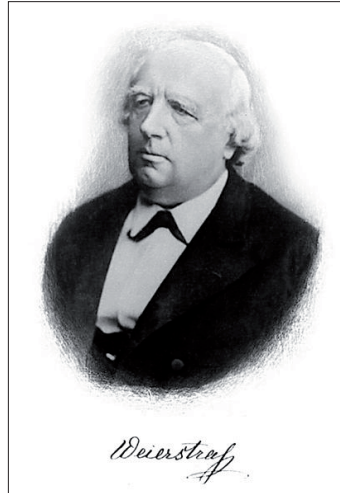
1. unserem Präsidenten, Prof. László Ungvári, der mich unbedingt haben wollte.
2. Martin Böhne, dem Vorstandssprecher des Geschäftsbereichs HR TSC der DTAG, der mir damals sagte, wir finden eine Lösung
3. RA Horst Wüstenbecker von Alpmann-Schmidt & Partner, der mich rechtlich beraten hat, und last but not least
4. Herrn Topel vom MWFK Brandenburg, der am Ende auch »die Kuh vom Eis« haben wollte.

Die letzten drei Genannten, alles Juristen, haben das Postpersonalrechtsgesetz passend interpretiert und daraus einen dreiseitigen Vertrag zwischen dem Land Brandenburg, der DTAG und mir gestrickt, so dass ich, für alle schadlos, für die Zeit von fünf Jahren zu, wie es so schön im Amtsdeutsch heißt: »der dem Bund geschuldeten Dienstleistung an das Land Brandenburg beurlaubt« werden konnte.

Meine Damen und Herren, das hat mich sehr an Goethe erinnert, dem, selber Jurist, folgender Spruch nachgesagt wird: »*Und kann das Recht es nicht belegen, so muss man etwas drunter legen.*«

#### Was ist geblieben? Was bleibt? Mission achieved?

Aus meiner Sicht, ich denke ja. 30 Jahre Berufserfahrung geben einem einen guten Rucksack an Wissen und Erfahrungen mit, die ich anwendungsbezogen in Forschung und Lehre umsetzen konnte. Es bleibt noch was übrig: z. B. die Numerische Mathematik für die Masters zu Ende zu führen. Da lasse ich Sie, meine Damen und Herren Studierende, nicht im Stich. Das gleiche gilt für alle aktuellen Bachelor- und Master- und andere Arbeiten, die ich zugesagt habe. Das Forschungsprojekt über-



Quelle: <http://www.wias-berlin.de/about/weierstrass>

nimmt Prof. Fabig, für meine Ämter in der akademischen Selbstverwaltung habe ich überall eine Nachfolgerin bzw. einen Nachfolger gefunden. Frau Prof. Richter hat meinen Platz im Redaktionskomitee der Wissenschaftlichen Beiträge der TH Wildau eingenommen, Prof. Brandes wurde vorgestern als mein Nachfolger im Amt des Vorsitzenden des Wahlvorstands der TH gewählt. Ich denke, mir ist es gelungen, diese Aufgabe des Schiedsrichters und z. T. auch des Ombudsmanns deutlich stärker in das Bewusstsein aller Hochschulgruppen einzupflanzen und als genauso wichtig wie z. B. den Senat zu verankern bis hin zur einzigen Hochschulvollversammlung, die ich aus gegebenem Anlass im vergangenen Jahr einberufen und leiten durfte. Meine Damen und Herren, ich denke, das Haus ist bestellt, ich kann gehen.

#### Wie geht es weiter?

Beruflich habe ich mich entschieden, um es in der Fliegersprache auszudrücken, den Sinkflug einzuleiten und die Landung vorzubereiten. Auf dem Weg dorthin mag es noch ein paar *holding patterns* geben. So habe ich den T-Labs versprochen, ihnen auf Anfrage noch zu helfen. Die TH Wildau wird meine akademische Heimat bleiben, aber zum Ende des Jahres will ich in den von der Telekom angebotenen Vorruhestand gehen. Man soll aufhören, wenn es am schönsten ist. Und ich denke, die Zeit ist gekommen. Sieht man von der Restlaufzeit ab, war es für mich alles in allem ein rundum vollendetes Berufsleben, das ich genau heute vor 35 Jahren mit der Ernennung zum Studienreferendar begann, und jetzt als Hochschullehrer beende, eine Position, die ich mir nie erträumt habe, aber zur schönsten Zeit meines Berufslebens überhaupt gehörte. Sie merken, ein bisschen von Weierstraß ist überall drin. Der Freigeist der *universitas*, mit jungen wissbegierigen Menschen und netten und kooperativen Kollegen und Kolleginnen arbeiten zu dürfen, war mir wie ein Jungbrunnen in der zweiten Hälfte meines Lebens. Auch diesen Freigeist und die Geselligkeit teile ich mit Weierstraß, wie man in seiner *Vita* nachlesen kann.

Demnächst stehen andere Dinge im Vordergrund, z. B. Familie und Hobbies, die über die vielen Jahre ein wenig kurz gekommen sind. Damit sage ich allen Dank, mit denen ich bis hierher mein Leben teilen durfte, beginnend bei meinen Eltern und endend bei allen Studierenden, Kollegen und Kolleginnen und neuen Freunden, die ich hier im Großraum Berlin gefunden habe. Ihr seid mir wichtige und anregende Zeitgenossen. Bleibt mir gewogen und lasst die Verbindung nicht abreißen. Und was die Wissenschaft angeht: ein Professor hört erst auf, wissenschaftlich zu arbeiten, wenn er den letzten Atemzug tut. Ich hoffe, das ist noch ein bisschen hin.

Ich mach mich auf zu neuen Ufern...

Vielen Dank!

## STUDENT AWARDS

*Laudatio: Bernd Eylert, Julian Gebhardt*

### Best Abstract

Criteria: Relevancy, Bridging Technical and Social Aspect of Technology, Originality (theoretical and empirical), and Argumentation.

### 3rd Place (splitted)

#### ***Mobile Phone as an Everday Lifestyle Object – The move from “plain old mobile” to “electronic brain in your pocket”***

Daniela Stärke and Stefan Kramer (Technical University of Wildau)

The paper investigates the history and future of mobile communication and puts a special focus on the question of all questions: Which direction will the evolution of mobile devices take? Their results are not only of highest relevancy for the industry, e.g. operators, providers and suppliers but also to the social study of technology: what have people done, what are they doing now and what will they do in future.

and

#### ***Communication on general aviation airfields in cases of emergencies***

Michael Höynck and Daniel Starke (Technical University of Wildau)

The paper deals with a very important question in today's risk societies, namely “How to make airports more secure?”, e.g. sabotages or terrorism attacks. As it stemped out a key issue here is to improve the communication between the major forces working on airports, e.g. police, security staff, fire fighters, and operation controllers. Allthrough the presenters clearly defined the key factors in improving the interaction between those groups they also had to face the solid fact that it is not easy or better almost impossible to set those into practice.

### 1st Place (splitted)

#### *Filmic Representations of Human Computer Interaction*

Gesa Ruge (University of Bochum)

The paper investigates the aesthetic influences that film and games have on each other. On the example of recent fictional art works Mrs. Ruge reflects on the cultural techniques of interacting with a computer and also on the nature of virtuality and games themselves. In doing so her work represents a very important and challenging attempt to define such crucial concepts like reality, virtual reality, cyberspace, and inter-acting in such new environments.

and

#### *Human-Computer-Interaction (HCI): Perspectives of communication science: appropriation and technological change*

Nele Heise (University of Erfurt)

This paper tackles a very important problem for both computer scientists, designers and communication scientists, namely to better understand the processes of using and adopting new technologies into people's everyday lives. On the basis of two fundamental approaches in sociology, namely the "Social Shaping of Technology" and "Domestication Theory" Mrs. Heise clearly shows how humans and technologies are in a constant dialectic of change.

### Best Presentation

#### 3rd Place

#### *Filmic Representations of Human Computer Interaction*

Gesa Ruge (University of Bochum)

The paper investigates the aesthetic influences that film and games have on each other. On the example of recent fictional art works Mrs. Ruge reflects on the cultural techniques of interacting with a computer and also on the nature of virtuality and games themselves. In doing so her work represents a very important and challenging attempt to define such crucial concepts like reality, virtual reality, cyberspace, and inter-acting in such new environments.

#### 2nd Place

#### *Project Google Street View*

Sven Bathke, Dennis Dornbusch, Timo Schmidt (Technical University of Wildau)

The paper deals with "Google Street View" and the question of informational self-determination in Germany. Is such a project legally allowed in Germany and do the Germans want it at all? To answer these questions a survey is carried out in the region Berlin-Brandenburg, which shall also settle the question about the acceptance and the awareness to this topic. The paper examines the technological conditions, the sociological environment, political conditions and economic changes of Google Street View and relates them to the legal aspects of this project.

#### 1st Place

#### *Human-Computer-Interaction (HCI): Perspectives of communication science: appropriation and technological change*

Nele Heise (University of Erfurt)

This paper tackles a very important problem for both computer scientists, designers and communication scientists, namely to better understand the processes of using and adopting new technologies into people's everyday lives. On the basis of two fundamental approaches in sociology, namely the "Social Shaping of Technology" and "Domestication Theory" Mrs. Heise clearly shows how humans and technologies are in a constant dialectic of change.



TH Wildau [FH]  
Bahnhofstraße  
15745 Wildau  
[www.th-wildau.de](http://www.th-wildau.de)