

# Preface

In a way, virtual worlds enable us to open a door to a fascinating and magical place. Where we are generally limited by the physics and our resources, virtual worlds allow us to go a step further and create new worlds, worlds that replicate our known reality or elaborate our phantasy to create fantastic places with new, innovative, creative, and unlimited objects and characters. And similar to Peter Pan, we can live our dreams while keeping a tight connection to the reality as the user and its avatar becoming a functional homogenetic unit taking the advantage of both worlds.

Expressing creativity and implementing new worlds bring a new opportunity for learning spaces, where learners have systems restrictions, can apply multiple media to realize their content, and experiment on ideas without risks. On the one hand, avatars allow consciously hiding behind their avatar, expressing a new identity, and, on the other hand, are able to conduct projects too dangerous or complex for the real world. Machines too expensive or available due to environmental reasons can be generated and used, for example, using lunar vehicles to learn about the moon surface. The handcrafted objects by learners follow the constructivist understanding of learning as it is characterized by idealized types of learning environments. Using virtual worlds in the context of teaching and learning showcases the possibilities of interconnected and scalable metrics of time, processes, and an Internet-based decentralized access.

The benefits of virtual spaces are not limited to educational scenarios but have great advantages for businesses, independent of being service-oriented or being a manufacturer. Virtual worlds incorporate all technologies necessary to promote brands and products by building showcases for displaying the product as well as the associated processes from development to production. Furthermore, the usage of products in defined scenarios is observable and direct as well as indirect individual feedback can be used for product improvement.

In contrast to the real world, rapid prototyping allows far shorter product cycles, i.e. to mass-customize the product. In most virtual worlds, trade and sale of virtual goods and services is common and even cross-selling and ticketing for the real world is becoming more popular. Where real-world limitations like space, time, or distance are causing organizational problems, virtual worlds can be used for extension.

It becomes common to have synchronous streams of live events in virtual worlds, where everyone can participate without being physically present at a certain real-world location. The 3D spaces supersede, for example, video streaming by providing a high degree of immersion and interactivity. Avatars experience a full 3D audio, interact with other users through their avatars at the same place at the same time, and can interact with objects. Thus, virtual worlds facilitate socializing and building networks similar to social networks like Facebook. Communication through avatars increases credibility, reduces the impression of anonymity, and reduces by this the wastage of resources in addressing others than just the target group.

By those means, the hype and run for all the possibilities using Second Life as synonym for virtual worlds in 2006 wasn't very surprising in the aftermath. Nevertheless, expectations were not fulfilled after a short period of gold-mining the virtual space. There are many success stories but mainly on educational areas and certain niches like simulation. The Gartner IT research company, originally predicting the hype, changed their expectations after some years, although still seeing public virtual worlds as a key technology for the next 5–10 years. Reasons for the rather low acceptance of virtual worlds are manifold. One often mentioned criterion is about the intention why to use virtual worlds. While games are defined by goals and specific game principles, open virtual worlds don't provide a structure and the aims are non-specific or defined with respect to the context. Other constraints can be seen in the proximity of the "look and feel" of open virtual worlds in relation to digital computer or console games: social bias against digital games, the disbelief in effectiveness of game-based learning concepts as well as the digital divide in terms of instrumental media literacy in the use of game-like user interfaces and patterns of navigation. While users without or less connection to digital games associate the image of virtual worlds as "too playful" and, therefore, more likely to be unserious, *gamer* criticizes the lack of graphics compared to the state of the art in digital game productions which usually retrace the quality of the content.

Last, the technological aspects further constrain the acceptance. The need for installing a client combined with the affordance of high hardware specifications is scaring off the casual user. Additional technological limitations like exporting avatars or inventory to other worlds are resulting in insular situations in which no user wants to be trapped.

Nevertheless the European media coverage of virtual worlds and alternative realities is covering both expectations and critical reviews. International business, education, and research activities in online environments are still emerging exponentially. In comparison, Europe's participation in the new market shows promising technological advances but hampered partly unjustified prejudices and naïve implementations that do not take characteristics and opportunities of the innovative and future-oriented media into account. Even though several European institutes conduct intensive research in conjunction with alternative realities and have gained international reputation for their achievements, there are still several barriers to be defeated in the years to come.

## ***Book Overview***

In this spirit this book is not a manual to enter or navigate in alternate realities but demonstrate the manifold opportunities to unlock a promising, innovative, and not yet fully developed market in education and business. The general focus is set on the scientific community but integrates the practical application for businesses. This book bridges a gap in the growing market of virtual world literature. Nevertheless, the book has a unique position as it is the first to combine education and economics to provide answers from experts on how to handle the virtual worlds phenomena and create a business model with Return on Investment (ROI). The theory is combined with applications and descriptions of use cases in education and business.

As virtual worlds flatten the world by bringing people from all over the world into the same environment, we provide chapters about the influences and impacts in and around virtual worlds. International authors—all experts in their field with several years of practical experience—discuss the current state of the art of alternate realities, the target group, and how virtual worlds will develop over the next years.

**Part I** covers the subject of “from where” virtual worlds are coming and “to where” they are going to. A retrospective by *Jean Miller*, responsible for Linden Lab’s service Second’s Life and international development, titled “How Linden built a virtual world for business and education,” gives a deep insight view to the genesis of the first idea of a 3D-online-game environment to the probably most known, popular, and contemporary public virtual world named Second Life.

Within this open environment real-world-like content adaption is proceeded. *Yesha Sivan*, head of the Information System at the School of Management and Economy at the Tel-Aviv-Yaffo Academic College, describes this phenomena as “real virtual worlds.” His chapter presents an outlook to the potentials and challenges of those worlds and predicts, in analogy with Gartner’s Report, a substantial relevancy in the next 5–10 years.

**Part II** is about the social dimension in the use of virtual worlds. *Tanja Adamus* and *Axel Nattland*, both research associates at the Learning Lab University Duisburg-Essen/Germany, and *Lars Schlenker*, research associate at the Media Center of the University of Technology Dresden/Germany, explore and interpret Second Life as the “social environment” which facilitates interpersonal interaction and communication by demonstrating three examples in the context of higher education.

The meaning, finding, and organization of social groups in virtual worlds in the context of learning processes are questioned in the article “social navigation for learning in immersive world” by *Jon Dron*, professor at Athabasca University.

**Part III** focuses on the topic of “collaboration.” *Michael Schuler* from Hamburg University outlines the requirements for team processes and opportunities for supporting team management and development in virtual worlds. *Dennis Maciuszek* and Professor *Alke Martens* at the eLearning and Cognitive Systems Lab, University of Rostock/Germany, discuss together with Professor *Ulrike Lucke* and her scientific assistant *Raphael Zender* at the Institute for Multimedia Application Systems, University of Potsdam/Germany, the potential of virtual worlds for inquiry-based teaching of science and engineering topics. The authors incorporate their experiences from their virtual lab for learning about cognitive modelling and applied arti-

ficial intelligence. Despite their tough start in creating the virtual environment, they conclude that virtual worlds are in fact useful for creating virtual lab environments.

**Part IV** is about (distant) education with focus on learning environments and experiences, pedagogical models, and the effects on the different roles in the educational sector.

*Sue Gregory*, adult educator and lecturer in ICT in the School of Education and Chair of the Australian and New Zealand Virtual Worlds Working Group, is dedicated to virtual worlds as a medium for distance learning. She describes her research results and comes to the conclusion that participants in virtual worlds achieve better learning results as they—in comparison with conventional learning management system users—are more involved, maintain and build up their social contacts, and have a higher motivation. From the results shown in her chapter, it is clearly recognizable that virtual worlds support learning and lead to better engagement in distance learning.

Professor *Andreas Hebbel-Seeger*, Vice Dean at the MHMK, Macromedia University of Applied Sciences for Media and Communication at Campus Hamburg/Germany, highlights and elaborates the educational and psychological aspects of virtual environments. He depicts some best practice cases for the use in education, theoretical approaches, and their implications.

*Suzanne Aurillio*, Director of Technology Enhanced Instruction and Faculty Support in the College of Extended Studies at the San Diego State University/USA, takes a closer look at adult learners as a target group and raises the question about adults as learners and the circumstances under which they engage in purposeful learning. She tries to familiarize the reader with examples from Second Life and several recreational world-building practices as comprised by the desire, creativity, and purposeful learning of Second Life residents.

*Lincoln C. Wood*, a senior lecturer at Auckland University of Technology (New Zealand) and an adjunct research fellow at Curtin Business School (Perth), and *Torsten Reiners*, a senior lecturer in Logistics and Supply Chain at Curtin Business School, examine the role of bots in virtual worlds and how they can be upgraded to non-player characters (NPCs) to support educational processes. This rests on improvements in technology, game-based elements, and gamification; concepts that can be incorporated into instructional design processes to facilitate the development of effective learning scenarios in virtual worlds.

To complete the educational perspective, *Dennis Schäffer* and *Jörg Heeren*, both at the Faculty of Education at the Bielefeld University/Germany, introduce “e-learning 3D.” They researched and worked over a period of 3 years on a university project, which focuses on the development of a virtual learning environment in which students as well as lecturers could interact without being actually on the campus. Besides the practical description of the learning sites and the set of applied tools for educators, they provide an insight into the different university user groups and their experiences as learners in virtual worlds as well as an outlook on the development of Second Life as a learning space. In **Part 12.5** use cases and scenarios of integration are described: from design and implementation up to appli-

cation. The authors focus on business models and how companies can participate in virtual worlds while receiving a return of investment.

*Jan Northoff*, founder and manager of the 3D Internet agency “Youin3D,” located in Berlin/Germany, explains the parts and key aspects of the revenue model for his company. He also looks at the key aspects of setting up a business concept within Second Life and OpenSim. He also explains the special features about the development of the virtual city “BERLINin3D.com,” a three-dimensional replica of Germanys capital Berlin, using Second Life technology.

IT-manager *Frank Boerger* of German-based TÜV NORD Group and *Hanno Tietgens*, owner of BÜRO X Media Lab and initiator of “Campus Hamburg in 3D,” give the practical example of a virtual world being applied profitably in a business context. They used Second Life to enhance corporate education, distance collaboration, and avatar-based trainings for TÜV NORD’s international staff of engineers, certification experts, and safety solution providers, producing ROI within just 1 year. Following the rapid convergence of online, mobile and games technology beyond Second Life, their article also describes for the first time how toolkits and services as diverse as OpenSim, OpenWonderland, Twinity, Unity3D, Blue Mars, ProtoSphere, and more were explored and evaluated. Educational 3D content was even staged in Facebook, Google Earth, and browsers supporting WebGL, taking the benefits of 3D to the open Internet.

The final Part highlights the development and implementation benefits of dynamic learning environments. *Christian Gütl*, senior lecturer at the Institute for Information Systems and Computer Media at the University of Graz/Austria, Professor *Vanessa Chang*, head of School at Curtin University/Australia, and research fellow *Stefan Freudenthaler* at University of Graz/Austria describe their development of a tool which supports instructional designers, teachers, students, and learning groups to easily design a learning environment, which the authors also illustrate through a case example. Furthermore some “workarounds” to limitations in Second Life are presented and explained. Nevertheless, the feasibility of an application that enables users to create and reuse the virtual learning environments is emphasized in detail in this chapter.

*Carl Dreher*, research fellow at Curtin Business School, *Torsten Reiners*, senior lecturer for logistics at the Curtin Business iSchool, and *Heinz Dreher*, professor for information systems at the Curtin Business School, Curtin University/Australia describe the benefits and limitations of using 3D digital ecosystems (3DDE) for research, development, and commercialization. Based on their lessons learned from various university research projects they introduce a new system development methodology including a guideline for 3D ecosystem projects. They develop suggestions for future innovations in research, development, and commercialization of information systems incorporating systems like virtual worlds.

This book emerged from the belief in the specific potentials of virtual worlds, despite the mapped restrictions, problems, and challenges.

Hamburg, Germany  
West Australia, Australia  
Bielefeld, Germany

Andreas Hebbel-Seeger  
Torsten Reiners  
Dennis Schäffer

Synthetic Worlds

Emerging Technologies in Education and Economics

Hebbel-Seeger, A.; Reiners, T.; Schäffer, D. (Eds.)

2014, XX, 415 p. 179 illus., 161 illus. in color.,

Hardcover

ISBN: 978-1-4614-6285-9