

Learning from Media Arts: Second Life as Augmented Reality Interface for Learning

Thomas Winkler
University of Luebeck
Institute for Multimedia and Interactive Systems (IMIS)
Luebeck, Germany
winkler@imis.uni-luebeck.de

Martina Ide-Schoening
Institute of Quality Development at Schools in Schleswig-Holstein (IQSH)
Kiel, Germany
m.ide-schoening@travedsl.de

Michael Herczeg
Institute for Multimedia and Interactive Systems (IMIS)
University of Luebeck
Lübeck, Germany
herczeg@imis.uni-luebeck.de

Abstract: Contemporary artistic approaches to *Second Life* provide a variety of models for meaningful interactions with physical and digital reality. By offering multiple forms of communication and interaction as with Second Life (SL) they help to broaden social, ethical and professional competence. However, if SL is restricted to the digital replication of real-physical space only, the potential for new learning spaces and methods will remain unaffected as shown by numerous hierarchically structured virtual spaces of high schools and universities in SL. Contrarily, the spaces collectively created by many creative SL users already show more complex and rich forms of communication and interaction. With an artistic and critical intertwining of these digital with the physical spaces of real life the collaboratively created utopia models may have much more impact.

Introduction

During the last years, numerous digital 3-dimensional learning spaces have been created, predominantly in the context with Second Life¹ (SL). A wide range of publications can be found about this virtual world, mainly referring to possibilities of distance learning in SL (i.e. Lindeberg, 2006). However, in this paper we examine how effective learning spaces can be created by the multi-modal intertwining of the artificial 3-dimensional world with the physical world.

Virtual space, as being something different from the "real world", stems from pre-modern conceptualizations of the 19th century. In the 21st century, however, digital 3-dimensional spaces do not function merely as virtual spaces anymore. New physical interfaces (i.e. ambient or tangible media) provide means for the digital enrichment of the physical world.

Art reflects contemporary phenomena as does SL, which becomes evident when focussing on coeval medial art. The four artistic works, introduced in this paper, deal with aspects of the semantic relation and technical interconnection between the digital and the physical world as well as forms of identity within mixed worlds. Furthermore, this paper exemplifies in how far artistic refraction as event permits conceptualisation, reflection and intensification of contemporary means of communication and present social utopias.

¹ by Linden Research Inc.

Within a course programme, designed for 12th grade students, strategies from media art give new impulses concerning developing new ideas and modes of behaviour. Thus, while oscillating between the two “worlds” in a creative process, divergent patterns of interpretation and behaviour provide room for self-directed and playful experiences.

Learning spaces in Second Life

Possibilities of Second Life

Today SL is a three-dimensional virtual world web with up to 50.000 users at the same time, and more than one million registered users during a time span of 60 days, who are connected simultaneously via the internet worldwide. Since 2003, the Linden Research provides free access to a basic version. In contrast to online computer games such as WOW (World of Warcraft), which attracts nearly 8 million users over a period of 30 days within the United States of America and Europe, SL does not provide a plot or a story leading to a specific goal. Here, the users have choices to create their own virtual life. Whatever the user's goal is - it is up to a user himself respectively herself what to do with one's “second life”. SL provides a wide range of possibilities to create and develop one's own virtual world by designing and programming individual objects which constitutes one of SL main assets. Linden's 3-dimensional editor and its programming language Linden-Script provides a wide range of possibilities to define and create the content according to individual goals (Nusch, 2007).



Fig. 1: Scenery developed by WWF in SL



Fig. 2: Imaginative architecture in SL



Fig. 3: Clothes shop in SL. A user seeking for eye contact.



Fig. 4: A Furry, a human, and a mythical creature talking in the collective build “Apfeland”

Masks of Identity

Unfortunately, the *Kids Grid* of SL has not been accessible for European teenagers aged 13 to 17 years at the date of production of this paper. Thus, the students participating in this project had to be 18-years-old (or older). With SL, users have the choice to create their own virtual identity by either choosing from given avatars or by creating their individual character. However, the predefined avatars provide a wide range of parameters to create specific characters. By introducing themselves with their avatars in chat-rooms, SL users have the possibility to communicate about their characters via speech audio, text chat, or even with gestures or "eye contact" (Fig. 3).

The virtual character functions as mediator between the user's real identity and the virtual world. Paradigms such as sex or gender, the division of the species (e.g. human being, animal, or mythical creature (Fig. 4) are of free choice. Poll results show that two thirds of SL users are male whereas only a third is female. Interesting enough, it is approximately one fifth of all male users who present themselves as female avatars in SL (Nusch, 2007). Actually, outer appearance and body motion play an important role. Using free download program users have access to create various animations for their avatars for little money. So called *Newbies* (new-born avatars) are identified from the users by comparing these to the visually differentiated existing avatars according to standardized outer appearances and motion patterns. Also, interesting designs of the avatar's outer appearance seems to be of great importance concerning acceptance within the various SL communities.

Furthermore, there are SL users who do not buy or sell (Fig. 3), and who prefer to meet in an atmosphere of mutual understanding of advantage without risk. In contrast to the "classical" internet, providing little security concerning privacy and anonymity, with SL people can meet at many different and secluded places (Fig. 4) to communicate.

Learning Spaces

Looking at architectural rooms of high schools and universities in SL and concentrating on contemporary needs and issues it becomes obvious, that form (design) follows (its traditional) function in its very sense, which is ex-cathedra teaching with students consuming mainly passively. Thus, information is presented predominantly in ways of language, text, image, video, or 3-dimensional animations. Consequently, innovative learning arrangements are seldom found, such as multi-codal and multi-modal learning, self-directed research and exploring as well as collaborative, topic-oriented, subject-relating learning contextualised according to real, everyday needs. (Figs. 5, 6).



Fig. 5: Traditional, hierarchic instruction space at the MIT campus in SL



Fig. 6: *Science School* with text, pictures and animated models.

Contrarily, the sites designed by the users themselves, e.g. the "Apfeland" (land of apples) do match the needs of contemporary learning spaces (arrangements). "Inhabitants" meet up in different combinations with fanciful avatars to communicate in so called "sandboxes" in order to create and apply new objects and scripts.

Collective Intelligence

SL is designed as a medium for collective communication and interaction. As within a group of youngsters calling each other via the mobile phone to communicate about possible places to meet up in the evening, SL users

behave similar. With both examples it is not important to define a specific aim beforehand as nobody overpowers the other. One of the main assets of SL is that user groups create their world interactively in a never-ending circle of collaborative design. Due to its medial structure SL fosters *swarm intelligence* in the sense of collective intelligence (Kerckhove, 2007).

The principle of non hierarchical structures facilitates dynamic, self-directed behaviour and learning which is structured according to the “creator's” concepts. Flexibility and plurality of the model optimize interaction, provide a potential for a constructive transformation of pedagogical processes within single learning-communities.



Fig. 6: Communicating in the collectively designed “Apfelfland” (land of apple(s))



Fig. 7: SL-user while designing objects collaboratively in a “sandbox”.

From Virtual Reality to Digital Augmented Reality

SL itself mirrors the ideas of the 1980 and 1990s: the simulation of reality as a virtual world. However, the beginning of the 21st century is coined by new radical forms of computer-based interaction where the physical world is augmented digitally (Digitally Augmented Reality, Ubiquitous Computing, Tangible, Ambient and Mobile Media). The virtual and digitally augmented worlds are very different concepts: in Virtual Reality users are placed mentally within the digital simulation whereas in Augmented Reality they interact within the physical space.

Within a typical Virtual-Reality-System, users act exclusively in virtual space without regard of their physical existence. Contrarily, within the digitally augmented physical space, users act instantaneously and directly in the real-physical world, which is extended and enriched by digital information. The alternation of the media-supported realms of experience becomes evident when imagining the following picture: Whenever watching a movie in a cinema or on an oversized wide screen or when playing a computer game, which is connected to the screen, people forget about the physical reality as it merges together with the virtual reality. However, watching the same movie or playing a game on the small display of a PDA in your hand, and where the plot of the game is mainly within the physical space and the richness of sensory perception, i.e. as with *Moles*, the Mobile Learning Exploration System (Melzer at all., 2007), the individual experience is different: The player is still present in the physical space and the display functions as an extension of an all-embracing experience, without dominating the physical space. “So it all depends on how we understand the idea of addition: we may add additional information to our experience – or we may add an altogether different experience” (Manowich, 2002).

Artistic Reflections about Second Life

Typical artful and contemporary approaches to the phenomenon SL at the verge of the 21st century, as presented at *Ars Electronica* in Linz, Austria (2007), combine the physical with the digital realm in the sense of a interactive mixed reality installation (e.g. *Baywatch*), artificial interactive workshops (e.g. *Handmade*), exhibition of textiles (*Missing Image*), or a mixed reality table soccer game (*Stiff People's League*).

Concerning *Baywatch*, the physical reality of the urban sphere (Fig. 7) emerges with the virtual SL world (Fig. 8) designing an artificial scenario created within both worlds: the beach. The avatars moving around within the scenario, are perceived in the real world by acoustic and visual signals; they move around in the virtual and the

physical world simultaneously (Kuka, 2007). Traces of these movements can even be perceived in the physical world/reality, e.g. a wave in a basin triggered off by a hint of a movement at a market place in the town of Linz. At this beach event, it is even possible for people walking by to participate in SL via provided notebooks closing this circle of communication between real and virtual space. Thus, SL was opened up to the physical sphere in order to allow people in the physical world to take part in SL. In the process of overlapping or intertwining of both realities a new space emerges - that of a combined reality.



Fig. 7: *Baywatch*, Pfarrplatz, Linz, Austria



Fig. 8: *Baywatch* in SL

The project *Handmade* enables the participant to design handmade clothes for the virtual world (SL). Thus, it is more creative not to buy already existing clothes but to design clothing individually. Here SL provides templates (picture/visual data/stencils) and the corresponding software (e.g. *The Gimp*). In order that this creative process is not limited to the digital sphere only, it is possible to print out the designed clothes-templates (*Handmade*) in life model size, bridging the gap between design process of virtual clothing and the real world (Pohflepp, 2007).

In SL a missing or damaged picture data of a specific design is automatically replaced by a standard-error-texture. On this picture data, shown as a digital "pattern chart", the message "MISSING IMAGE" is generated on white background (Fig. 9). With his art project *Missing Image* Aram Bartholl transforms this image (Fig. 10) into a real, skin-tight long sleeve adding gloves (Fig. 11) and transfers it to the physical world. Whereas this graphic error indicates the loss of self-designed identity within SL, Bartholl's work offers means to reflect upon the importance of clothing. In contrast to the clothes created in the *Handmade* project *Missing Image* constituted a real object offered at the *Ars Electronica* exhibition (Pohflepp, 2007).



Fig. 9: „MISSING IMAGE“ in SL



Fig. 11: SL image as pattern for print



Fig. 10: *Missing Image* in real-physical space

In a mixed reality table soccer game, called *Stiff People's League*, people as avatars work together with visitors to the *Ars Electronica* Festival in Linz, Austria. Virtual players are great at pushing the ball towards the other team's goal and blocking shots from directions the soccer figures can't get to. Players at the soccer table play primarily an interference role, moving quickly to block shots that avatars can't get to in time, getting in the way of avatars on the other team, and pushing avatars around who are trying to sneak by them. Because two different interfaces were used, reflections about the significance of interfaces have been encouraged. How an evaluation of the game design at MIT shows, it is likely, that the collective attendance within the hybrid space created a level of accountability that kept people playing fairly. The researchers think that it is of importance that people know without instruction, what good behaviour looked like based on being in physical space as well and by watching other people play.



Fig. 12: View of the stadium in *Second Life* over the shoulder of a player.



Fig. 13: Players interacting with the foosball table interface.

With all four examples it becomes evident that, within the artistic process which itself is linked to an authentic event, an unavoidable negation of traditional cognitions can have a positive effects in terms of innovative approaches towards medial art. Art functions as a "rubbing surface" mirroring new establishing cognitions. (Lyotard, 1988).

SL at School

Contemporary arts classes should integrate phenomena of today's world such as SL for example. When dealing with these phenomena, teachers and students should choose pieces of art which tie in with an all-embracing approach towards a meaningful intertwining of digital and physical space. Here, young people have the chance to reflect upon their behaviour within the physical world; they can evaluate the function or importance of clothing regarding the construction of identity.

Creating collective role models for individual behaviour should be considered as an active process which accounts for responsible ethical and moral values of today's society, notably incorporating the students' real daily experiences with the digital world. Only by doing so, an overall sense of what is right or wrong within our societies and its consequences can be enhanced and transmitted.

Concerning SL in fine arts classes, the virtual space merges with the real space only when SL is not only a mean of simulation but when it mirrors the physical world in multiple ways (e.g. Life Video, Voice Chat, reactions on sensory data of the physical world) and vice versa (effects of actions in SL in physical space). It is important that young people do not loose themselves in the digital world but that both worlds are connected in a meaningful and useful way.

For this reason we let students of a 12th grade (all already 18 years old) of the *Carl-Jacob-Burckhardt-Gymnasium* in Luebeck (a municipal high school) transpose their real world clothing to digital within SL, as well as digital elements from SL into the physical space (Fig. 14, 15). Therefore we arranged a back projection in the classroom and a video stream "projection" within SL, where students encounter students as avatars 1:1, using voice chat additionally.



Fig. 14: Mareike as avatar in SL in front of a streaming video of Maria.



Fig. 15: Maria communicating with Mareike, wearing her jacket in SL.

However, blowing-up the digital projection in the physical space did not create the effect of digital immersion. Instead, the space was experienced as augmented physical space.

Summary and Conclusion

SL provides space for playful and creative, non-hierarchical activities, which, unfortunately, is scarcely provided in other current learning arrangements.

In our project with 12th grade students of a municipal high school, we were able to show new ways of creating communication and interaction spaces using SL, bridging the gap between the physical and a digital 3-dimensional space.

In the context of latest works of media art various possibilities to integrate new means of communication and interaction become evident. In artistic works combinations of the physical with the digital third dimension have been implemented in various ways with the KIMM-Initiative referring to the production of “Mixed-Reality-Learning-Arrangements” (Winkler & Herczeg 2007). In cooperation with the *Carl-Jacob-Burckhard-Gymnasium* and other schools we realized numerous tangible and ambient media interfaces for a 3D web space (Winkler & Herczeg, 2004; Winkler & Herczeg 2007). There are plans to develop new physical interfaces for SL and similar environments in order to make SL applicable to various educational scenarios and for a cultivation of digital augmentations of the physical realm.

References

- Kerckhove, D. (2007). *Connected Intelligence: The Arrivel of the Web Society*. Toronto: Somerville House Books.
- Kuka, D. (2007). *Baywach*. In: Goodbye Privacy, *Ars Electronica 2007* (pp. 208). Stocker, G. and Schoepf, C. (Eds.), Ostfildern: Hatje & Cantz.
- Lyotard, J.-F. (1988). *Peregrinations: Law, Form, Event*, New York: Columbia University Press.
- Lindeberg, C. (2006). *Distance Learning in Second Life – a guided tour in Rosario*. In T. Reeves & S. Yamashita (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006* (pp. 711-716). Chesapeake, VA: AACE.
- Manovich, L: *The Poetics of Augmented Space. Learning from Prada*. 2002 (pp. 8). Available at: http://www.manovich.net/DOCS/augmented_space.doc [12, 6th 2007]
- Melzer, A., Hadley, L., Glasemann, M., Werner S., Winkler, T. & Herczeg, M. (2007). *Using Iterative Desgin and Development for Mobile Learning Systems in School Projects*. In: *Proceedings of ICEC CELDA*.

Nusch, M. (2007). *Mit dem Bus durch Second Life*. Fischer: Frankfurt am Main.

Pohflepp, P. (2007). *Workshops Handmade*. In: Goodbye Privacy, Ars Electronica 2007. G. Stocker and C. Schoepf (Eds.), (pp. 231). Ostfildern: Hatje & Cantz.

Winkler, T., Herczeg, M. (2007). *Digitally Augmented Multy-sensory Learning Spaces - An Interdisciplinary Approach Towards Aesthetic Creation and Computational Modelling in Schools*. Published on the non profit DVD: Constructivist Pedagogy - Powerful Pedagogies for Learning for South Australian teachers Learning to Learn Initiative - Department of Education & Children's Services, Curriculum Services, 2007
31 Flinders Street GPO, Box 1152 ADELAIDE SA 5001.

Winkler, T., Herczeg, M. (2004). *Avatars - can they help developing personality among students in school? - Consequences of connecting the physical world with interactive 3D-Worlds to hybrid experience and acting spaces to promote sophisticated social behavior*. IEEE XPIRE / Proceedings of the ITHET, Istanbul, Turkey.

Winkler, T., Herczeg, M., Reimann, D. & Hoepel, I. *Learning in our increasing digital world by connecting it to bodyly experience , dealing with identity and systemic thinking*. Proceedings of the SITE Conference, Atlanta, GA, USA, 2004.

KiMM Media Lab: http://www.kimm.uni-luebeck.de/projektinfo/kimm_lab.html [12, 6th 2007]

Stiff People's League: <http://www.stiffpeoplesleague.com> [12, 6th 2007]

List of Figures

Fig. 1 to 8 and 9 to 14 to 15 by the Kids in Media and Motion initiative (KiMM), University of Luebeck [2007]

Fig. 9 to 11 by Aram Bartholl: <http://datenform.de/mi.html> [12, 6th 2007]

Fig. 12 and 13 by Stiff People's League, MIT [2007].