

ART PRACTICE IN COLLABORATIVE VIRTUAL ENVIRONMENTS

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This article addresses and characterises creative art processes in Collaborative Virtual Environments (CVEs), examining how most art works in CVEs escape and resist taxonomic classification given their unstable and fluid nature, which is often open and participatory.

Introduction

Collaborative Virtual Environments (CVEs) are digital, distributed virtual spaces that support collaborative activities (Churchill, Snowden and Munro 2001: 4). In this article, we will focus on the Second Life (SL) platform, as well as on others that use the same data communication protocol, based on OpenSimulator (OS), since their visual and procedural aspects are very similar. We chose to examine these platforms in particular because they allow any number of users to collaborate in the creation of very diverse artefacts, and because, at the time of writing, both SL and OS house an abundantly productive artistic community. We speak of collaboration and creation, and it is important to stress the creative affordances of the virtual environments under discussion, in addition to the collaborative ones. As we shall demonstrate, those affordances set them apart from other popular virtual environments. For, if many virtual environments, such as multiplayer games, allow for some forms of collaboration, users there are largely limited to performative activities within pre-established contexts, narratives and settings. SL and OS, on the other hand, are open worlds where users can build everything from the ground up (quite literally, as the landscape itself is reducible to a void), create their own narratives and redefine their virtual self.

CVEs are often referred to as virtual worlds or the metaverse. The term 'metaverse' was coined in 1992 by the writer Neal Stephenson in his novel *Snow Crash* (1992). There, the metaverse was a fully immersive three-dimensional space where people interacted through avatars. Today, the term is used to refer to the collective online space as a whole, particularly with regard to virtual worlds. We speak of metaverse, virtual worlds or synthetic worlds when we

refer to a “computer-generated physical space, represented graphically in three dimensions, that can be experienced by many people at once” (Castranova 2005: 22). Boellstorff suggests three fundamental elements in “virtual worlds: they are (1) places, (2) inhabited by persons, (3) and enabled by online technologies” (Boellestorff 2010: 17).

SL and OS residents interact with the virtual world, and each other, via an avatar. They are able to build new 3D digital objects, as well as upload their own contents, designed outside the platform, such as image files, 3D models, sounds, animations and other scripts. These worlds are therefore created mostly by their residents, thus becoming a privileged environment for the birth of the most diverse art forms. However, artworks in CVEs resist being categorised in taxonomies, because they are unstable and fluid, frequently open and participatory in nature. Although present in numerous art forms, the playfulness of the creative act is a prevalent feature of art practice in CVEs (Ayiter 2012: 170). This playful dimension extends to the fruition of these projects, contributing to the transformation of the aesthetic experience into a creative one, while also adding to its elusiveness in terms of categorisation.

This is why a strict categorisation of such practices can be seen as a fruitless toil. But simple as it may be, such a framework may assist us in gaining further insight into the scope and breadth of current and future art works in CVEs. For this reason, we provide a simple and brief description of the various art forms found in the SL and OS CVEs, so that those not familiar with these environments can better understand both the creative potential and the cultural significance of CVEs. In order to characterise and illustrate such art forms, we shall briefly present and discuss a few selected works from the aforementioned CVEs. It should be noted that the following projects encompass more than one of the proposed categories. This will become evident as we

describe how they frequently develop asynchronously, changing both their processes and their manifestations.

Art typologies in CVEs

We begin with two main groups: one for works developed in the metaverse, which will be referred to as 'metaverse-based'; and one for works derived therefrom, which will be referred to as 'metaverse-derived'. Within the former, we can identify environments and objects, avatars and performance. In the latter group, derived works include virtual photography and machinima.

- Metaverse-based

We begin with Environments and Objects, which range from entire art-habitats (Ayiter and Ugajin 2015) to stand-alone objects. These include landscape terraforming and building, architecture, installations and dioramas, digital sculptures, object and equipment design, external mesh modelling and sound. Environments and objects can be further developed through scripting, thus enabling dynamic properties and interactive behaviours.

An excellent example of this kind of art practice is the work by the artist Cherry Manga. Her work *Insanity*, a 2014 environment at MetaLES SIM, in SL, is a surreal landscape where giant and disfigured bodies sprout from desolate dunes (Fig. 01). We can find several techniques in this work: the windlight design; the modelling of objects in mesh, conceived externally and then uploaded to SL as digital sculptures; the use of scripts to animate objects; and soundscaping, using sounds attached to objects across the space.

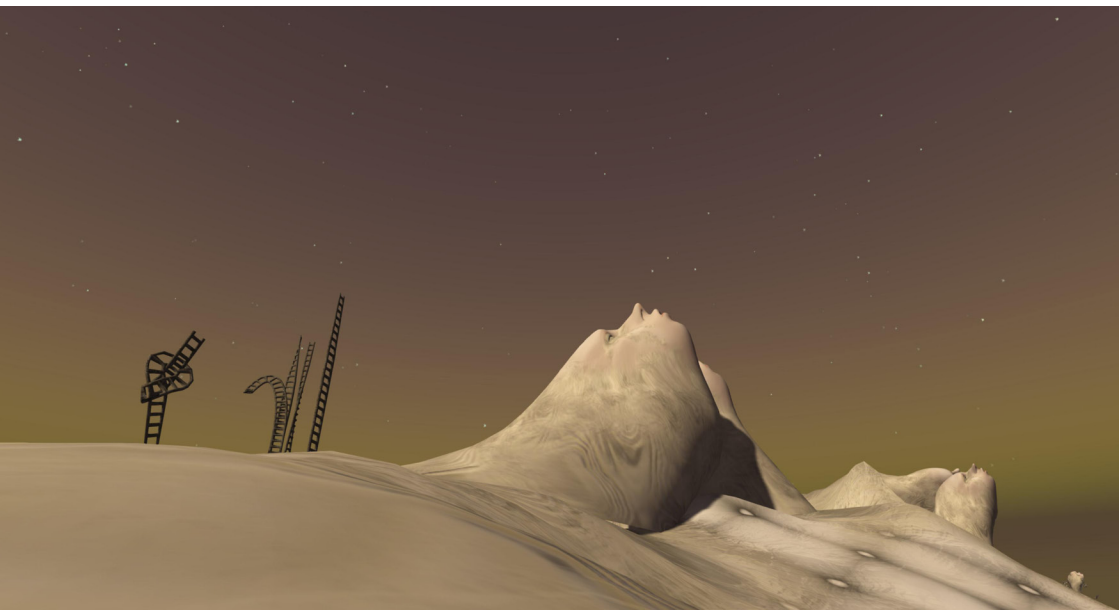


Fig. 01 - Cherry Manga, *Insanity*, 2014. Screenshot by CapCat Ragu.

The Inevitability of Fate was a 2012 installation by Saskia Boddeke, known in SL as Rose Borchovski¹, at the SL Two Fish SIM. A narrative unfolded along a path on the landscape, enveloping residents in the history of Angry Beth and Lot, a mother and her son at the outbreak of a war that would separate them. In the virtual environment, one could witness Lot's birthday and see his childhood toys. Further ahead, a yellow ribbon pinned on their bodies symbolised their new condition. After the war, Beth came back, but the child was gone. That was how Beth became Angry Beth. In this work, Boddeke uses space as a structural element to organise the narrative through time, using objects as evocative landmarks, and visitors need to travel through the installation in order to 'read' a story that is told to them through all the aspects of a constructed environment.

In the category of avatars, we can consider all manifestations that relate to their design: skin and clothing texture design, body shape design, the design of all kinds of objects that can be associated with avatars — hair, clothing, accessories of many different types and animations, which can slightly modify, or completely take control of, an avatar's behaviour. Interesting examples can be found in the avatars and accessories designed by I. Struebel, known in SL as Cutea Benelli, for the *Grim Bros.* brand. One of her creations, *Broken Bot Buddy*, exemplifies how the creation of avatars can be an art practice (Fig. 02). On a social network, the artist reflects upon her creative process:

“What would happen, I thought, if you created a compassionate robot with the sole purpose of taking care of others – and then, like all the other technology we use, you left it to rot in the cellar, with nobody to care about – and to care for? From this basic notion of a neglected care robot, the look of ‘compassion program’ became clear in my mind: friendly, female, almost

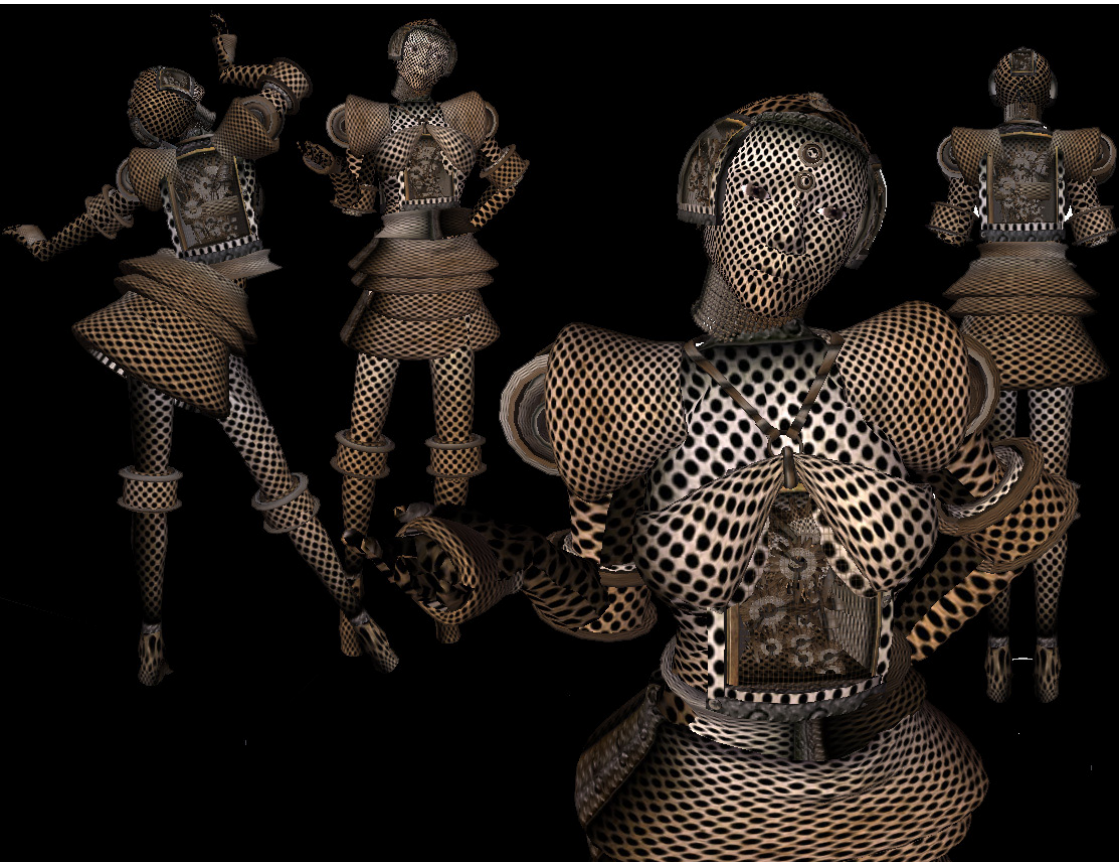


Fig. 02 - Cutea Benelli, *Broken Bot Buddy*, 2014. © Cutea Benelli 2014.

motherly, vaguely nurse-ish, with a touch of sadness and forgotten-ness. Rusty, of course, not shiny” (Benelli 2014).

Alpha.tribe avatars are also an interesting reference. Designed by Elif Ayiter, divided into a tribe of alts², they escape mainstream stereotypes and challenge residents with a different take on embodiment – these avatar creations seem to highlight the way in which standard avatars are representations of an idealised, sexist body. *Alpha.tribe* avatars deviate from human representation, although without totally abandoning the human metaphor. This type of work would only be possible in a creative collaborative virtual environment, where one is free from pre-established constraints in gender representation, present in most popular multiplayer role-playing or action games – in which the players are often unable to even choose their own gender.

In CVEs, artistic activities carried out by avatars fall into the performance subgroup. While this includes simulations of conventional art forms such as theatre, opera, dance, circus and musical performance, CVEs provide the grounds and tools for new types of enactments, tailored to explore the medium’s specificity.

The duo of Portuguese artists Kikas Babenco and Marmaduke Arado takes advantage of the ability to attach artefacts to avatars, in order to display full installations in the world, which in reality are not part of the environment, but are ‘worn’ by their avatars. Kikas and Marmaduke use this strategy in their performances to create a strong visual impact, usually with satirical intent towards the world of art and the social codes of the metaverse. These events are usually improvised and participatory, as the artists often offer their artefacts to the public and invite them to join in the performance (Fig. 03).

The approach used by the artist SaveMe Oh, while similar in strategy, is more heavily focused on her artistic persona – whose avatar, more

than an author, embodies the work itself. SaveMe referred to herself (an avatar) as an artwork and not as an author, in the talk promoted by Transdisciplinares Artes Lisboa (2014), in the activities related to the event and exhibition entitled *Virtual Interactive Participatory Arts*. SaveMe presents herself as an agent provocateur in the art world, often invading artistic events with her performances, which can cover a whole SIM.

It should be noted that, while it can be argued that this somewhat ironical questioning of authorship and identity may have roots in previous 'real world' works, the spatial, environmental and behavioural properties of Babenco, Arado and Oh's performances are unique to the affordances of a CVE and could hardly take place in our world.

- Metaverse-derived

The second group, metaverse-derived works, consists of art practices that draw upon the metaverse, but are not necessarily constructions of that world. One popular example is the first subgroup, virtual photography.

CVEs enable us to capture still images of virtual worlds. Usually the icon that signals this functionality depicts a still camera. It is common practice among metaverse residents to refer to these images as photographs. Image capture in the metaverse can serve the exact same purpose as in the physical world – memories of time spent with others, news reporting, fashion, advertising and, of course, artistic purposes. A prime example of the latter is the work by the photographer Nur_Moo, Commissioner of the legendary SIM Poetik_Velvets, whose career in the metaverse dates back to 2007.



Fig. 03 - Kikas Babenco & Marmaduke Arado, performance at Slactions, 2013.
Screenshot by CapCat Ragu.

Moo is also a photographer in physical reality. She uses the specific possibilities of light and colour in SL, either through manipulation of windlight or the use of light sources associated with prims. The artist plays with the installation of objects as a setting, and with the possibilities of layered editing in Raster Graphic Editors (Fig. 04).

Deborah Lombardo, known in the metaverse as Harbor Galaxy, has a more painterly approach. She uses Raster Graphic Editors to enhance colour saturation and play with contour and texture. Her approach to female body representation defies standards and stereotypes in depicting age, nudity and intimacy.

However, not all virtual photography is edited outside the platform. Ziki Questi is an SL blogger, and in *Ziki Questi's Blog*³ she reviews arts and destinations in the metaverse. Her posts are profusely illustrated with her own virtual photographs of the places she visits. Most of her work depends solely on light, angle, depth of field and framing – photography's basic principles. Although her approach is mostly documental in nature, the resulting images become art works in their own right, not only because of Ziki's technical mastery, but more particularly because of her ability in capturing the *pathos* of each place.

Machinima can be defined as the capture of moving images in real time using 3D rendering engines in digital environments (Zagalo 2012: 2). This is a form of expression generally associated with video gaming culture, since a large part of the machinima being produced uses computer game engines (Picard 2006) and real-time gameplay. Although this is their origin, their growth and development go beyond the cultural universe of games, a phenomenon favoured by the greater technical quality and increasing affordability of multiple online platforms for its creation and dissemination (Lowood and Nitsche 2011: viii), such as SL and OS. The machinima conceived



Fig. 04 - Nur_Moo, *Under an OcTree **, 2013. © Nur_Moo 2013.

in these platforms, unlike the video game derivatives, do not rely on stringent aesthetic or themed environments, as in EverQuest or World of Warcraft (Pinchbeck and Gras 2011: 143). Thus, like virtual photography, they become the ideal environment for artistic development and art documentation.

One of the most interesting artists using machinima as a medium is Ole Etzel, the author of the series of machinima that tell the stories of Mr and Mrs Bones, who moved away from each other when Mr Bones decided to sail out to sea. Ole Etzel not only shoots and edits his machinimas, he also performs the voices and songs.

A case where documentation becomes another art work is Iono Allen's machinima *The Inevitability of Fate* (2012) documenting the homonymous work by Rose Borchovski, mentioned before (Figs. 05-08). The film holds true to Borchovski's narrative, making it emerge from the environment path, all the way from Lot's birthday to his plunge into the void. Virtual photography and machinima often connect CVEs with the rest of the World Wide Web, for, although they can be displayed in virtual worlds, they are often shared on social networks, blogs and other web locations.

Due to the structural nature of most CVEs, in that they operate in privately-owned remote servers, the vast majority of works made in the metaverse have no possibility of archival storage or preservation, except when held in OS and stored in the artist's own computer. In SL, however, once dismantled, the work can only be stored in the resident's inventory, piece by piece like parts in a warehouse, and this inventory can only be accessed through the SL platform. The possibility of revisiting such works is often limited to alternative forms of registration, such as virtual photography and machinima. Exhibitions in physical reality also often resort to these as a way of

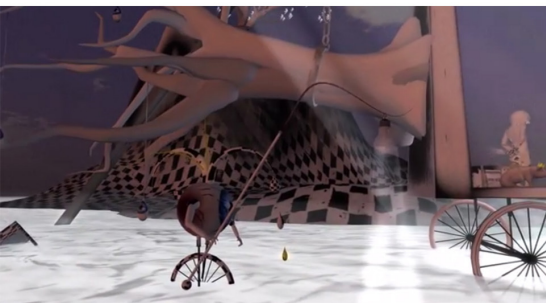


Fig. 05/08 - Iono Allen, *The Inevitability of Fate*, 2012. Machinima of the virtual environment of the same name by Rose Borchovski. Machinima screenshots by CapCat Ragu.

showing CVE art works, because they are easier to display in prints, in projections or on screens. However, these records are not substitutes or replacements of the original art work, nor do they reproduce one's aesthetic experience in the virtual world. Virtual photography and machinima based on previous art works actually occupy two ambivalent places in our aesthetic experience: on the one hand, they trigger new aesthetic experiences; and, on the other hand, they are the result of an aesthetic experience that has a creative dimension. They are the result of lines of flight between art works, digital platforms and, in some cases, instances of the real (the virtual and the tangible). Although they present themselves in a specific medium, they are already hybrid in their creative process.

Hybridisation

This demonstrates our initial proposition that most projects in CVEs fit into more than one of these subgroups and art forms, as they present hybrid features and permeate several categories and instances of reality. This is the case with Alpha Auer's (Elif Ayiter's main avatar) *Asemia*, which involves avatars, environment and object design, as well as soundscaping, all in a single project. This project explores writing stripped of its semantic content. It was part of the collaborative installation *Further Along the Path*, commissioned in 2012 by Bryn Oh, in SL, and sponsored by the Linden Endowment for the Arts (LEA) (Ayiter 2013). This installation was designed by various artists, drawing upon the surrealist concept of *cadavre exquis*, i.e. each installation merges into the one by the following artist (Oh 2012). *Asemia* was an enormous sphere with a textual and textural landscape featuring its own inhabitants – the avatars that were part of this project. The author states that her roots in graphic design

guided her to an aesthetic approach to typographic forms and textual texture (Ayiter 2013). In addition to the asemic text, Alpha Auer also created a soundscape of vocalisations that made no apparent sense, but whose sound could evoke a foreign language. The whole design revolved around a semantically null verballity.

Another instance of this kind of hybridisation is the *LPDT2/3* projects. This installation was inspired by the pioneering digital design of Roy Ascott's *LPDT*, rethought 30 years later by Max Moswitzer, Selavy Oh and Alpha Auer, first with *LPDT2* in SL in 2010 and then, in 2012, with *LPDT3* in the New Genres Grid (Fig. 09). Max Moswitzer and Selavy Oh were responsible for the planning and architecture, while Alpha Auer was in charge of the soundscape and avatars. However, the entire project was designed by the three authors, with additional collaboration from Heidi Dahlsveen, known in the metaverse as Mimesis Monday, in the animation of avatars (*LPDT2/3*, 2012). The environment here becomes a visual and auditory flow, where the plurality of authorship is combined, without any loss of consistency. Avatars merge with such ease into the environment that it often becomes difficult to distinguish space from body.

This is sometimes also the case in works by Eupalinos Ugajin, an artist famous for both his responsive buildings and his shape-shifting avatar, which is always substantially different from all the avatars that can be found in the metaverse. If the playful dimension of art is a feature in virtual environments in general, for Eupalinos Ugajin it becomes the main feature. The artist literally plays with all kinds of virtual artefacts, remixing his materials with creations from other authors, which we can think of as virtual ready-mades. In many instances, his avatar includes attachments that make it hard to distinguish between the avatar and its surroundings, giving it a performative dimension – effectively mixing all three categories: environments and objects,

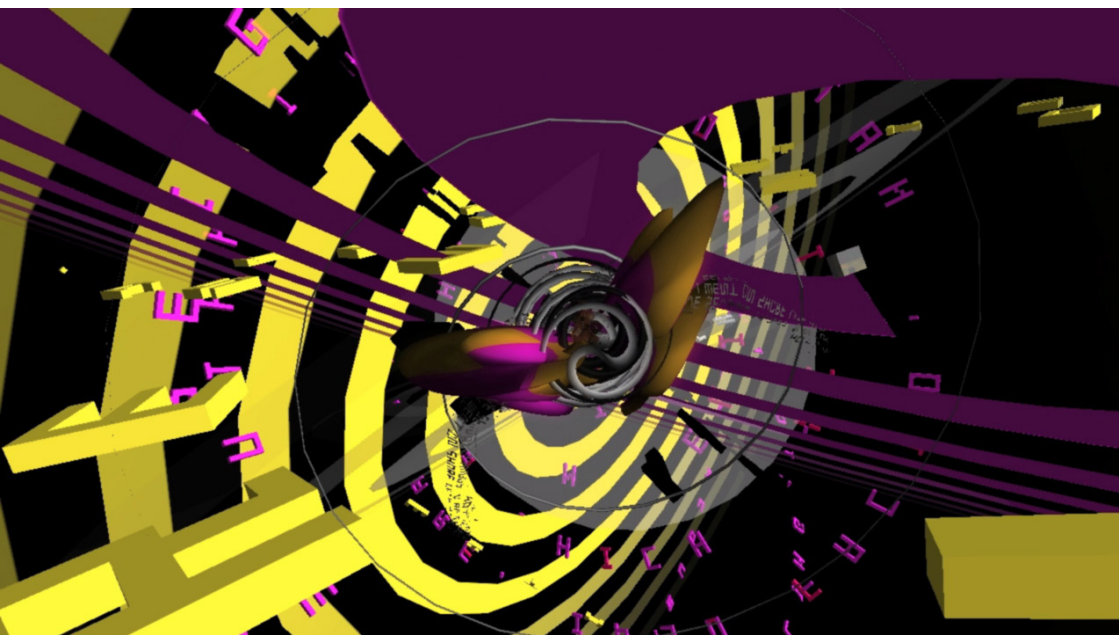


Fig. 09 - Max Moswitzer, Selavy Oh and Alpha Auer, *LPDT3*, 2012 (environment and avatar). Screenshot by CapCat Ragu.

avatars and performance (Figs. 10-13). Both his buildings and his avatars become assemblages of body parts, objects, sounds and animations. Ayiter considers that these creations emerge from a bisociative process, a creative process advocated by Athur Koestler, who believes that the creative act is the result of the juxtaposition of two apparently antagonistic frames of thought (Ayiter 2011: 31-36).

Eupalinos Ugajin is also the initiator of the 2013-14 project *Moving Islands*, at the Linden Endowment for the Arts (LEA), an open-ended artistic collaboration where several artists created rafts or islands that drifted over the flooded SIM. Ayiter and Ugajin consider that one might think of this project as an extension of the way in which the artist uses his avatar – “an entire virtual landmass that acquires an aggregated identity that reflects the participants of the project, coming into being through their combined prims” (Ayiter and Ugajin 2015). More than thirty artists participated, accepting Ugajin’s challenge to create this environment in a collaborative way. Ayiter and Ugajin highlight the fact that these artists came from different backgrounds, with different methodologies and different formal and conceptual approaches. Nevertheless, Ugajin managed to create a unifying environment for the pieces by using windlight. The way light and colour were reflected by the several artefacts became the unifying trait for these singularities.

In Bryn Oh’s *The Singularity of Kumiko*, in Immersiva SIM, in SL, the author created an array of artefacts including spaces, sounds, objects and animations (Fig. 14). The environment’s windlight is pitch black, except in illuminated key areas, and the visitor’s avatar is equipped with a head-mounted torch to light up the way. Apart from obvious references to the film *Donnie Darko*, Bryn Oh brings to this narrative stories and characters from previous projects. The visitor is invited to navigate a non-linear narrative that gradually unfolds, not only



Fig. 10/12 - Eupalinos Ugajin, *Chutes d'Images and other stories*, 2013. Machinima screenshots by CapCat Ragu.

Fig. 13 - Eupalinos Ugajin, *Musiclandia*, 2013. Machinima screenshots by CapCat Ragu.

inside Second Life, but also using hyperlinks as a way of expanding the playing field to the World Wide Web. Of particular relevance to the present study is the way in which this artwork relates to Bryn Oh's previous work, i.e. through the use of the machinima Juniper. This movie was associated with a poem in one of the rooms in the *Imogen and the Pigeons* installation, from 2013, also in Immersiva. Juniper is not the only character running through different works and different narratives by Bryn Oh. Their stories share relations and hyperlinks between them. The 2013 machinima appears in the 2014 installation as a link to a video-sharing page. So the film, designed as an art work, is based on previous work undertaken by the artist and is used as part of the new work. This is indeed a demonstration of the specific characteristics of the virtual environment, which encourage rhizomatic relationships between various projects, forms of expression, and even platforms.

Senses Places, a project initiated by the Portuguese choreographer Isabel Valverde and the New Zealand engineer Todd Chochrane, is an innovative example of performance practice in virtual worlds (Fig. 15). Their experimental and participatory dance project in SL combines physical and virtual performance using sensors. Both performers and audience participants (in the physical environment and in the virtual world) animate avatars in real time, while performing. Real-time video of the physical performance is broadcast in SL, while SL real-time rendering is projected onto the physical performance space. Clara Gomes (2014) refers to it as “a project of participatory cybperformance in a mixed reality environment seeking to develop corporeality, body awareness and amplification of the senses through the kinaesthesia running through the convergence between virtual and real”.

Meta_Body is an ongoing project, initiated by Catarina Carneiro de Sousa, known in the metaverse as CapCat Ragu, with Sameiro

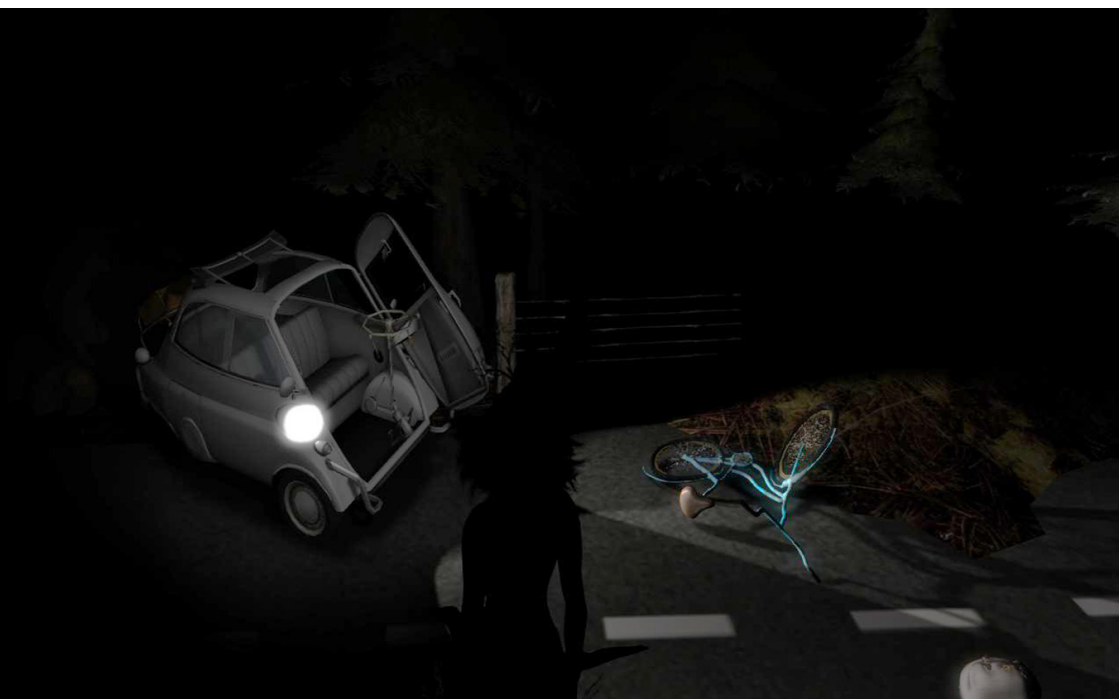


Fig. 14 - Bryn Oh, *The Singularity of Kumiko*, 2014. Screenshot by CapCat Ragu.



Fig. 15 - Multiple participants, *Senses Places*, performance at Slactions, 2013. Screenshot by CapCat Ragu.

Oliveira Martins, known in the metaverse as Meilo Minotaur, in 2011. Here the avatar is rethought as the body of language, open to experimentation. Eighteen avatars are made available to all residents. They are free to use, copy, modify and redistribute them, giving total freedom to ‘producers’ (Bruns and Schmidt 2010). This term, ‘producers’, was chosen over audience, as the project openly engages its participants and embraces their creative flow. A text note was distributed along with the avatars, with an open call for derivative works. 120 contributions were selected and presented as virtual photography and machinimas.

Shared creativity

The Meta_Body Project relies on a creative process we call ‘shared creativity’, in which creation cannot be reduced to a single author. Several components of the project were built by different authors and producers, working together in order to create a flexible, unstable and always unfinished body of work.

We propose three different approaches to the concept of shared creativity: collective creation, distributed creation and collaborative creation.

The first, collective creation, is the process used by Meilo Minotaur and CapCat Ragu in the construction of these avatars: a cell group acting as a single author, in a very intimate form of creative process. The complete dissolution of one’s identity in a group is utopian — a co-creative process where everyone is an equal partner in the process is very difficult to achieve in large and medium-sized groups, so that an equal partnership has more chance of success in a cellular structure.

The second, distributed creation, is the way in which the derivative

work was created. The first set of avatars was drawn upon to build new creations, which, in turn, fuelled a reserve of the new materials available. This relates to the concept of ‘produsage’, developed by Axel Bruns – a process in which the participants easily shift from users to producers and vice versa, originating a hybrid role in between (Bruns and Schmidt 2010). Such is the case with online communities organised towards creative sharing, mostly focused on the dissemination of visual results, from pile-ups on Flickr to Creative Commons collages, and including fan art on platforms such as DeviantART. This type of creation is community-based, i.e. it involves a large group with fluid roles, and not a team.

In 2013, a second phase of this project was started: *Meta_Body II*. We called upon residents to share derivative avatars that had *Meta_Body* avatars as their starting point. Any part of *Meta_Body* avatars could be used, as well as parts built by residents themselves or others (Fig. 16). All avatars should be provided with full permissions. As a result, twenty-two creators built twenty-six new avatars. The variety of participants ranged from renowned metaverse artists and designers to new residents, experiencing the Second Life platform and avatar building for the first time.

To distribute these avatars, four virtual installations were built by CapCat Ragu and Meilo Minotaur in four separate levels, designed as a tribute to the avatars they housed. Each level featured its own unique soundscape, also heavily inspired by, and evocative of, the surrounding materials, aesthetics and themes. Sound clips were scattered and layered onto the virtual spaces, forming seamless textures, melodic sequences or asynchronous compositions. As each sound unit is audible only within a certain radius of its placement, this causes the soundscapes to change when moving the avatar through space, thus creating a more immersive aural experience.



Fig. 16 - CapCat Ragu, *Untitled*, 2013. Virtual photography of the avatars *Appointment by the garden*, by Simotron Aquila, 2013, for *Meta_Body II* and *Godiva*, by CapCat Ragu & Meilo Minotaur, for *Meta_Body*, 2011.

This brings us to the third approach to the concept of shared creativity: collaborative creation, a process in which each artist retains their personal mark in a creative dialogue with others. The term collaboration comprises a wide range of creative processes and forms of organisation. As an open-ended concept, it refers to diverse methods of working together (Lind 2007). However, when we refer to collaborative creation, we are not using the term in this sense. Instead, we are describing a specific creative process, one that differs from those previously characterised. In the work resulting from this kind of process, one can roughly distinguish each author's work, even though they can blend in, making it difficult to define a borderline between them.

This was the case with the soundscapes, which Takio Ra designed as a contribution to the virtual installations built by CapCat Ragu and Meilo Minotaur. Even if the sound did not change any of the visual or physical aspects of their work, which remained untouched, it radically altered the perception of the environment and, in the end, became a key part of the project's design and experience. The sounds used are also being distributed with full permissions, feeding the distributed creation branch.

Conclusions

Pierre Lévy considers that the "canonical genre of cyberculture is the *virtual world*" (Lévy 2001: 125). However, he is not referring to what we defined earlier as CVEs, but to any "digital store of sensory and informational virtualities that are actualized only through interaction with human beings" (Lévy 2001: 125). Within this broad definition, the author also distinguishes two major types of virtual worlds:

- those that are limited and editorialized, such as CD-ROMs and 'closed' (off-line) installations by artists;
- those that are accessible over a network, and infinitely open to interaction, transformation, and connection with other virtual worlds (online)" (Lévy 2001: 126).

The distinction between online and offline that Lévy suggests (note that the author stresses that this is not an opposition) is essential to the type of work that is proposed: a work of flow, a work-as-process, and a work-as-event. This sort of work, although it also exists off-line, is typical of cyberculture and is enhanced by the possibilities brought by web 2.0. They are co-constructed metamorphic works, which resist totalisation, either by intention (by the author) or by extension (through recording) (Lévy 2001: 127-129). This means that multiplicity in cyberculture art defies unification on account of *a* creator subject and origin, or unification as *a* work object, fixed and crystallised. Lévy considers that the new art arising from the possibilities opened up by both the new media and the World Wide Web embodies Deleuze and Guattari's (1987) concept of rhizome. For Lévy, the cyberculture artwork lives in the rhizome (Lévy 2001: 129). As we have demonstrated, beyond the obvious affordances of creating in a world free from the constraints of real world physics (such as gravity or the laws of thermodynamics), CVEs widen the possibilities and broaden access to co-creation and distributed authorship in an unprecedented way, thereby enhancing unforeseen kinds of rhizomatic connections.

Although they are still far from amounting to a mainstream experience, a growing number of artists are using CVEs to develop their artistic research and practice, as they offer conditions and allow for experiences not found anywhere else. Today, there is a growing

number of emerging, accessible technologies, such as affordable head-mounted devices for virtual reality, ranging from Oculus' Rift to Samsung's GearVR to Google's Cardboard. Technological development and artistic research are coming together on various fronts. The sum of these circumstances points us to the threshold of a new era in CVEs, one of the new challenges, but also the new possibilities for digital art.

Notes

¹ Whenever possible, we have provided the CVE artists' real names, as well as their avatar names. However, most of these artists choose not to reveal their real names and sign with their avatar names. For this reason, we refer to the real name only when first mentioning the artist and thereafter we use the avatar name.

² Alt is the term used to describe alternative avatars of the same subject.

³ <http://zikiquesti.blogspot.pt/>

References

Ayiter, E. (2013) *Asemia*. Available from: <<http://asemicavatar.blogspot.pt/>>. [Accessed 28 March 2014].

Ayiter, E. (2012) *Ground <c>: A Metaverse learning strategy for the creative fields*, Plymouth: University of Plymouth.

Ayiter, E. (2011) Bisociative Ludos: The Wondrous Tales of Eupalinos Ugajin and Naxos Loon. *Proceedings of 12th Consciousness Reframed International Research Conference Presence in the Mindfield: Art, Identity and the Technology of Transformation*. Lisbon, pp. 31-36.

Ayiter, E., and Ugajin, E. (2015) Moving Islands [Rafts]: A Collective Art Conglomeration in Second Life. Doyle, D. (ed.) *New Opportunities for Artistic Practice in Virtual Worlds*, London: IGI.

- Benelli, C. (2014) *How on earth did you come up with THAT idea? (A test.)*. Facebook. Available from: <<https://www.facebook.com/GrimBros/posts/770258869652001>>. [Accessed 28 March 2014].
- Boellestorff, T. (2010) *Coming of Age in Second Life. An Anthropologist Explores the Virtually Human*, Nova Jersey: Princeton University Press.
- Bruns, A., and Schmidt, J.-H. (2010) Producers: A Closer Look at Continuing Developments. *New Review of Hypermedia and Multimedia*. 17 (1) , pp. 3-7.
- Castranova, E. (2005) *Synthetic Worlds: The Business and Culture of Online Games*, Chicago: University of Chicago Press.
- Churchill, E. F., Snowdon, D. N. and Munro, A. J. (2001) Collaborative Virtual Environments: Digital Places and Spaces for Interaction for CSCW: An Introduction. Churchill, E. F., Snowdon, D. N. and Munro, A. J. *Collaborative Virtual Environments: Digital Places and Spaces for Interaction*, London: Springer.
- Deleuze, G., and Guattari, F. (1987) *A thousand plateaus: capitalism and schizophrenia*, Minneapolis: University of Minnesota Press.
- Gomes, C. (2014) Interactividade e Produtilização na Internet – o Caso da Ciberperformance. *Artcapital*. Available from: <<http://www.artcapital.net/perspetiva-167-clara-gomes-interactividade-e-produtilizacao-na-internet-o-caso-da-ciberperformance>>. [Accessed 12 December 2014].
- Lévy, P. (2001) *Cyberculture*, Minneapolis, London: University of Minnesota Press.
- Lind, M. (2007) 'The Collaborative Turn'. Billing, J., Lind, M. and Nilsson, L. (eds.) *Taking The Matter Into Common Hands: On Contemporary Art and Collaborative Practices*, London: Black Dog Publishing.
- Lowood, H., and Nitsche, M. (2011) *The Machinima Reader*, Cambridge: The MIT Press.
- LPDT2/3 (2012) *LPDT2/3 - La Plissure du Text 2/3*, Available from: <<http://lpdt2.blogspot.pt/>>. [Accessed 28 March 2014].
- Oh, B. (2012) *Further along the Path*. 1 February 2015. Available from: <<http://brynoh.blogspot.pt/2012/05/while-ago-wonderful-group-of-artists.html>>. [Accessed 28 March 2014].
- Picard, M. (2006) Machinima: Video Game As An Art Form?. *Proceedings of CGSA 2006 Symposium*, York.
- Pinchbeck, D., and Gras, R. (2011) From Game to World: "Traditional" and Second Life Machinima. Lowood, H. and Nitsche, M. (eds.). *The Machinima Reader*, Cambridge: The MIT Press.

Stephenson, N. (1992) Snow Crash, New York: Bantam Books.

Zagalo, N. (2012) Machinima Creative Tachnologie. Available from: <<http://www.slideshare.net/nzagalo/machinima-a-creative-technology>>. [Accessed 28 March 2014].