

Social and psychological impact of musical collective creative processes in virtual environments; The Avatar Orchestra Metaverse in Second Life

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1. Introduction

Virtuality is presented as a space for creation and expansion of physical reality. The perception and relationship of creative processes such as music, performance or experimentation within the virtual environment interact with and govern our physical realities, even when offline.

Avatar Orchestra Metaverse (AOM) is an example of this on/off-line world; an orchestra constituted by composers, artists and musicians from Europe and North America who interact, create, rehearse and play as avatars in a virtual platform so-called *Second Life* (SL). SL (www.secondlife.com) is a Metaverse launched in 2003 by Linden Lab.

Since its beginnings in early 2007, AOM has created and performed audiovisual works screened live at music and media events throughout Europe and North America. Composers represented include Bjorn Eriksson (Sweden); Leif Inge and Ole-Xin Foss (Norway); Andreas Mueller and Shintaro Miyazaki (Germany); Biagio Franca (Italy); Viv Corringham, Norman Lowrey, Pauline Oliveros and Tim Rischer (USA); and Tina Pearson, Erik Rzepka, Liz Solo and Jeremy Owen Turner (Canada). AOM has also collaborated with live musicians performing in mixed reality settings, including the ensemble Tinninnabulate (Troy, USA), Franziska Schroeder (Belfast), Christine Duncan and Anne Bourne (Toronto) among others.

The orchestra design and play new otherworldly virtual instruments while experimenting with sonic phenomena, identity, perception, telepathy and collectivity.

These instruments determine movement, sounds, and the release of light and textures that give visual indications of sounds made independently by the performers in real time. The performance is created completely within the networked 3-D environment world Second Life, there is no streaming involved.

Last performance of AOM was in Montreal, Canada on June, 1st, 2017, in a memorial festival in honor to Pauline Oliveros (<http://improvisationinstitute.ca/work->

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shops-conferences/mcgill-colloquium/mcgill-colloquium-2017/), one of the most famous composers and pioneers of the XXI century, and a member of the orchestra.

As opposite as other composers, AOM use their avatars as musical instruments, creating their compositions considering the position of the sounds arising from the corresponding avatars and, in the other hand, the position of the microphone for the public performance. The performance is carried out with the instruments, Head-Up Displays-HUDs; instruments that are constructed from uploading small sound samples of various sources into SL-, receivers, environments and animations directly designed and encoded by the participants. From the sound samples AOM constructs instruments the HUDs are a compilation of prim objects scripted to make sounds. The sound samples come from whomever had conceived and/or designed the instruments. Sound of the sounds are field recordings, electronic sounds, voices, etc.

All of AOM instruments, to date, are in-world in Second Life. All of the HUD instruments are constructed from uploading small sound samples of various sources into Second Life.

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AOM members who conceive of and make the HUDs might use any kind of software to create and process the sounds, outside of Second Life, that are eventually uploaded to Second Life to combine to create the instruments. This software, used outside SL, might include simple audio editing software, such as Audacity, or more complex programs such as Audition, ProTools, Ableton, Reaper, etc. There are many, and it is up to whomever is creating and uploading the sounds to determine that. Some of the sounds are also generated and/or processed with programs such as MaxMSP or Pure Data (PD). Similarly, for animations, the program Blender is used often, and of course Photoshop, Indesign and other visual editing tools are used outside of SL to create textures that are used to create the instrument objects and environments.

We do not work with PD patches or any other programs within Second Life to create the final HUDs or perform with them. (T. Pearson, personal communication, 2017)

The research records the reality created by the Orchestra in cyberspace with a case-study that we named “cybercase”, attending and participating in their rehearsals and in a live performance. The methodology applied was a mixed approach based on analysis of audiovisual and textual material collected during our presence in the sessions, from the physical and virtual point of view. The results indicate the creative processes shown by the members of the Orchestra in a descriptive way as well as applying grounded theory.

To define the theoretical background of the project, a comprehensive study of basic concepts such as music, space and time, as far as the communication processes, has been carried out.

The research has been focused on symbolic interactionism, which covers the study of the subjective meanings and the individual attributions of sense [1]. The selection

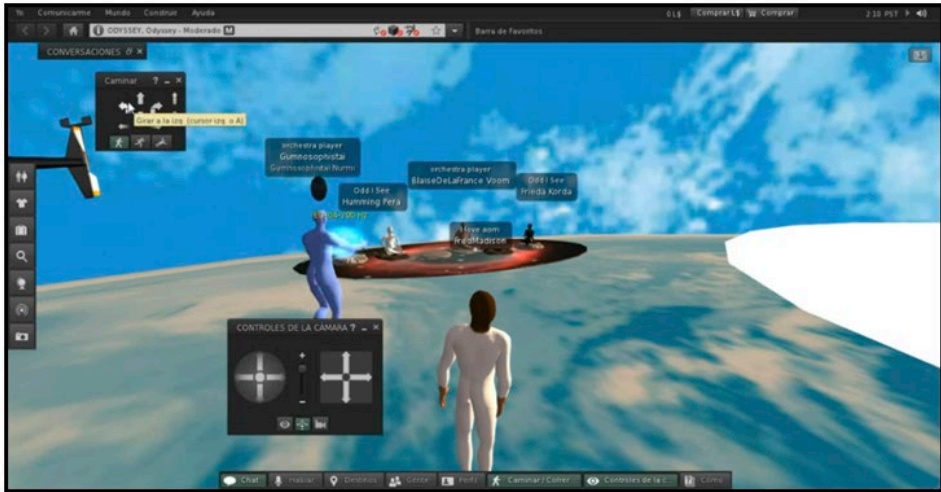


Figure 1. Avatars Gumnosophistai Nurmi, Humming Pera , Frieda Korda, BlaisedelaFrance Voom and us, Fred Madison. Screenshot from one of the rehearsals, showing the interfaz SL.

of the case study has been made according to the ideas of the Flyvbjerg, recognizing the importance of the case studies [2].

At the beginning, the main objective of the study was to check whether creative processes and interactions improving the creativity and the development of musical proposals can take place in virtual immersive environments, in particular in SL as a case model of mediation that could improve the creativity and the development of musical proposals of the AOM. However, once we met the orchestra, our target focused on them to determine what type of interactions and creative musical processes were taking place.

2. Social and psychological impact. Analysis and results

Most studies from SL are based on economics, education and psychology, whereas those based on art and creativity are poorly represented [3]. The book of Hebbel-Seeger, Reiners and Schäffer [4] covers the most recent studies on those frequently aborded fields.

The results of the study show the concept of virtuality within reality and the interactions occuring between physical and virtual realities [3]. The virtual environment is presented as a global space of interaction suitable for creation, experimentation and research beyond all geographical barriers. *Odyssey* (in SL) is shown as concerning greater experimentation and Vanguard. This is a virtual space of collaboration for artists from all around the world [3].

The results of the *AOM* show a relationship of emotions considered within the positivism such as curiosity, happiness, strength before change, subjective self-being or social involvement, among others, with the creative processes generated within a global framework of artistic collaboration [3].



Figure 2. (left) Avatars Gumnosophistai Nurmi, Miulew Takahe, Paco Mariani, Humming Pera and Fred Madison (researcher) performing “Come together” of Gazira Babeli. Screenshot.

Moreover, in these results the stunning attention span and deep listening attentively reflected in all subjects and the clear presence of Csikszentmihályi’s flow (FLOW) in each session is flagrant, which seems to be linked to perseverance and long-term creativity [3].

That presence of FLOW has a regular process: chat-dialogue-rehearsal-FLOW-dialogue-(chats) [3]. With *chat* we mean personal communications, and with *dialogue* we

mean speaking about things of the *AOM*. The parentheses mean that process occurs sometimes [3]. The rehearsal after the concert was totally dedicated to speaking about it. The ability to listen remains very high [3].

The *AOM* do not see problems, see challenges [3]. The feeling of belonging is as elevated as it is the mutual respect and admiration. Also, they have a person who organizes everything and looks after the interests of the group. This person also has also been helpful with all the procedures for this study [3].

We applied a qualitative analysis using the videos of the rehearsals, the fieldnotes and the questionnaires. We used *Dedoose* for doing the open coding and memoing, then we made the axial coding with Excell. The relations between codes to create the theory was done manually.

The emerging theory done with the *Grounded Theory* is:

The production of a critical thought -obtained across the combination of the individual perception of: deep thoughts, subjective well-being, empathy, specific acquired knowledge, feelings of belonging, strength towards change (positive vibrations), artistic sensibility, love, recognition, selfconfidence, passion, happiness; and that are used by means of the behaviours of: curiosity, versatility, social implication, praises, generosity, talent, sociableness, dedication, witnessing, amusement and good humor - seems to indicate a direct relation with the development of high levels of musical creativity and group performance, showed across immersive environments [3].

Inside the opposing relations, stands out the presence of the artistic sensibility, which shows high levels of relation with the recognition and with the feeling of belonging (and these mutually), and with the positive vibrations, understanding these as strength towards change (which relates to love) [3].

The theoretical models for the argument of this theory were based on:

The idea of creativity of Csikszentmihalyi, who understands creativity as a result of the interaction of a system composed of three elements: a culture that contains symbolic rules, a person who contributes with innovation to the change and an expert in the area that recognizes and validates the information [5]. These subsystems are necessary for an idea, product or creative discovery to take place [5].

The studies of Felipe Gértrudix and Manuel Gértrudix which say that among all the forms in which the music has been created, probably those ones with a collective nature are the ones that have had a greater transcendence [6]. It is because it treats itself about a social fact in a succession of cultural practices, as Felipe and Manuel understand the collective as a set of individuals acting on a synergistic way to reach a certain goal [6], even further with the new scenes to create music. The technological scene that has propitiated the web 2.0 in its social dimension has facilitated the development of an increasing profusion of services and has opened free tools for music creation that facilitate collaborative formulae [6].

This way, once the existing relationship between creativity and critical thought has been accepted, it should be assumed that to be creative is risky, since being critical use to be target misunderstanding and contempt and, therefore, it might be dangerous at least in the short term [7].

3. *The orchestra*

3.1. *Historical basis*

The story of the *Avatar Orchestra Metaverse* begins in March 2007, the date on which they began to work and play together.

The avatars: Maxxo Klaar, Paco Mariani, Dibou, Miulew Takahe, Dethomas, Bingo Onomatopoeia, and Vit Latynina were to meet throughout the months of December and January (2007) with the aim of making a live performance the 17th of January for the artistic celebration of birthday of Pomodoro Bolzano (PB).

PB is a group of media art formed in 1993 by Christian Wittkowsky (avatar Paco Mariani and *Max D. Well* (avatar Maxxo Klaar) and, at the beginning of the Avatar Orchestra Metaverse, by Johannes Riedmann (aka Jori Tokyo).

These meetings during this time generated discussions about future collaborative work which will combine music. They closed the date of the 19th February of 2007 to present the first encounter at *Dorkbot Second Life (SL)*.

There, they met to Maximilian Nakamura who presented the meeting. He was one of the first contacts they made (although he is not currently collaborating with the orchestra, he has meant a lot of help for that study).

After meeting with more avatars, they discussed the possibility of collaborative work, with the goal of running parts in the orchestra.

Among these ideas, they were doing in a virtual way *Vicky's Moskitos* (in this new concept of Orchestra in SL) and *Fadbeit*, a piece that *Maximilian* introduced.

The first idea of the departed was to perform *Vicky's Moskitos #13*. This original piece was composed by *Harold Schenllinx* (aka *Hars Hefferman*). He supported the idea of making a version in SL in the *Art.Think.Box*, the Camping and Caravanning Club Site of Pomodoro.

Peter Mertens (aka *Frans Peterman*), the other member next to *Harold*, *The Okooi* study, was invited to the festival *The Waag*, in Amsterdam, with which it was thought that it would be a good idea to perform the piece (VM#13) with the same clothing, both in the physical reality as in SL.

The procedure for such action was: *Bingo Onomatopoeia* programed the *aviophone* (fig.3) for this piece, Miulew Takahe wrote the score, think samples and edited the voices of Vicky in collaboration with Hars, which, together with Frans made the green dresses for the AOM, the same as they were in the physical world.

The 14th of March of 2007 they made their first performance. (fig.4)

The *Vicky's Moskitos* piece is a recording of 30 minutes and 7 seconds of duration of a reading of mosquitoes, a chapter of "Mars & Other Stars", a novel written by Schellinx during the first weekend of September 2004. The reading is carried out by the voice "Vicky" of Schellinx MacOS.

I believe Harold's piece is intended to always be interpreted within different contexts, rather freely as long the story is there. I had been involved in doing *Vicky's Moskitos*

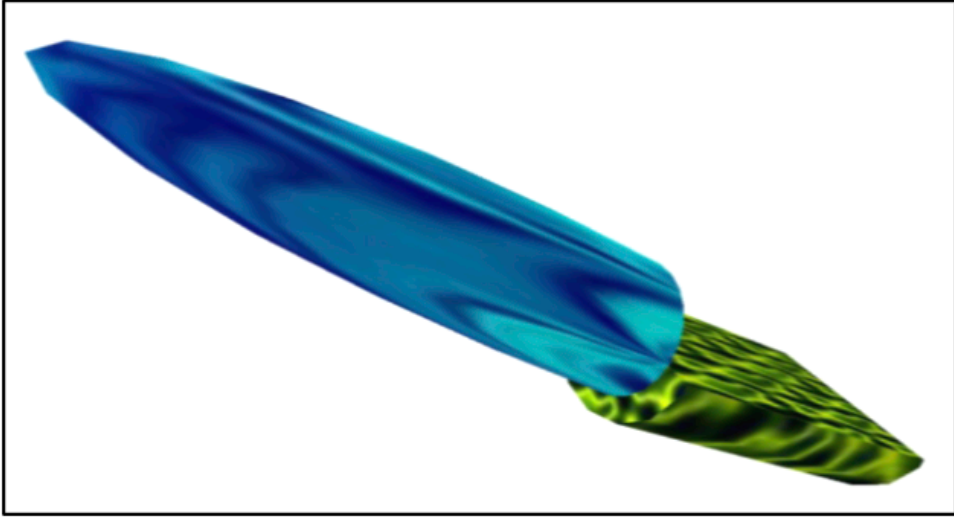


Figure 3. Aviophone, instrument created by Bingo Onomatopeia (Andreas Müller). Source: Photography courtesy of the AOM.



Figure 4. First performance of the AOM, performing the piece *Vickys Mosquitos (VM#13)* in the festival. Source: Photograph courtesy of the AOM.

(#12) in a real world situation in an old oil cistern with 25 sec reverbation time, so I was interested in following this approach in a virtual SL environment. I think there are

some following up Vickys Mosquitos after the AOM one. (B. Eriksson, personal communication, 2017)

For more info, the reader can consult some links [8][9].

3.2. *Some compositions of the orchestra*

3.2.1. *Fragula*

Fragula is a piece whose composition and sound samples are of Bjorn Eriksson and the design of instruments, animations and receivers of Andreas Müller (Fig.5 and 6).

The name of the piece, *Fragula*, which dates from 2007, has its origin in a game with the words “fragment”, “fragile”, “Fragula” and “Dracula”. It is one of the first pieces of the AOM, and continues to be one of the most famous pieces interpreted.

Eriksson relates how one of its main ideas is to have the Orchestra wandering from a fragile and synthesized texture of sound fragmented digital toward a more acoustic analog and without a lot of texture of sound fragmented, and then go back to where it all began.

This is aurally symbolized in the synthesizer sounds granules of a sine Wave, square waves and sawtooth. Synthetic being arpeggiated figures will be transformed gradually into sounds of a harmonium, with games imprecise. Extended moments of the harmonium provide a sound of transition between the sources of analog and digital sounds. Three sets of instruments are played at the same time, creating textural corals. Eriksson, in an article provided in the research, relates how in his second piece he wrote for the AOM, wanted to experiment more with sound and movement. In a first stage, had ideas about the creation of Doppler effects with players that are moved in relation to the public, but the technical limitations in SL made the piece will take other directions.

I used the software AudioMulch for making sinewaves in different progressions, lengths and also to make granulation of these especially for *Fragula*. Pure Data wasn't used in any of my pieces but I suggested another approach in an early discussion with Andreas Mueller about how to resolve the technical aspects of realizing the Heart of Tones. My approach was to search for a control method of triggering Pure Data patches which then should send audio to SL through mike inputs inworld. (B. Eriksson, personal communication, 2017)

The piece called *Fragula* is spectacular visually, as it includes avatars jumping and doing somersaults. Musically, the piece composed in the first part of a few different types of sounds; sine waves, tones that are cut, but controlled to specific frequencies, etc., followed by a part of the sounds of harmonium recorded by hand, Eriksson tried to work with contrasts between these two types of noise synthesized sound absorption sound in front of an acoustic instrument, with some similarities in the pure tone of

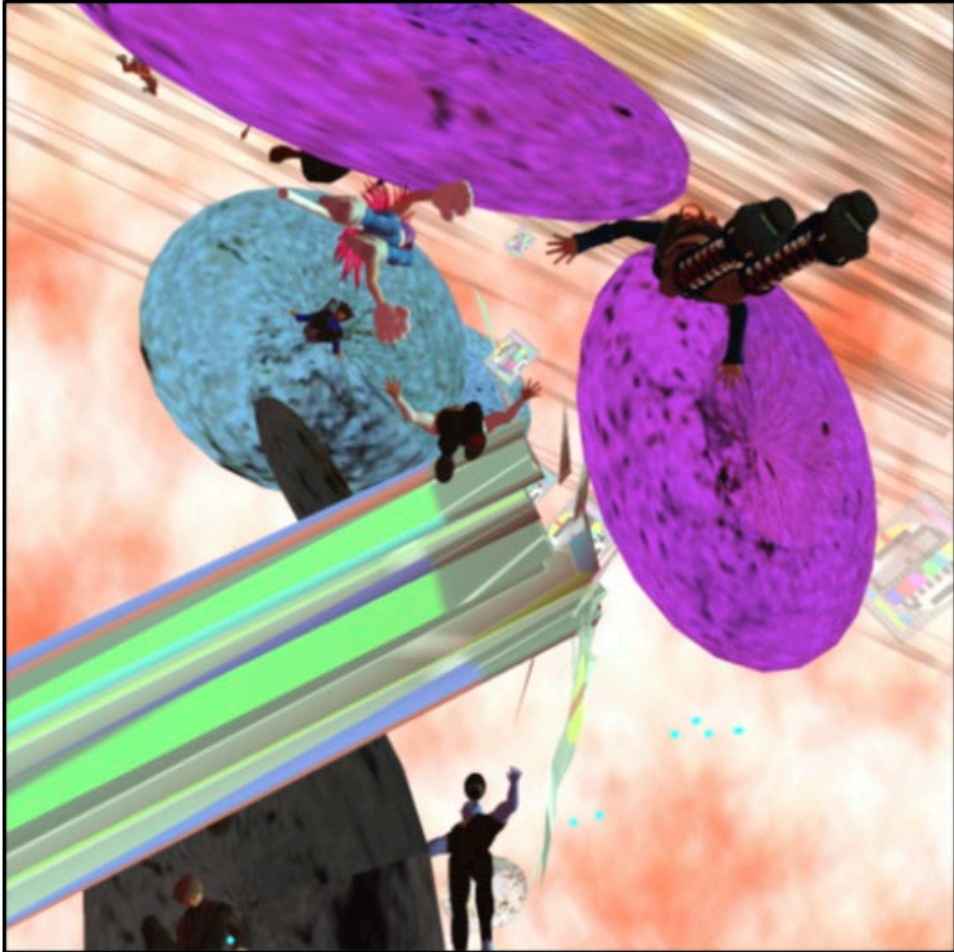


Figure 5. *Fragula*, 23rd October, 2007. Photography Bingo Onomatopoeia.

the harmonium. The third part is composed with melodies of synthetic sounds mixed with harmonium with sine waves. The piece is radically different in composition of another piece called “Rue Blanche” because “Fragula” does not have a predefined time line like an orchestra conductor continues, “Fragula” has emerged during the tests and partly improvised when choosing which combinations of sounds can sound good and which is the order in which the workpiece can occur. Eriksson says he likes this plasticity, which is only a way of expressing the paragraph. As well as perhaps you would like to make an updated version of *Fragula*, as the instruments designed for this piece are also used in other parts, and thanks, and recalls a performance in Brussels, in iMAL, center for culture and technology, where were three video projections and the scenery had sound and lighting in the room, in addition to a high-speed internet connection, which made it memorable.

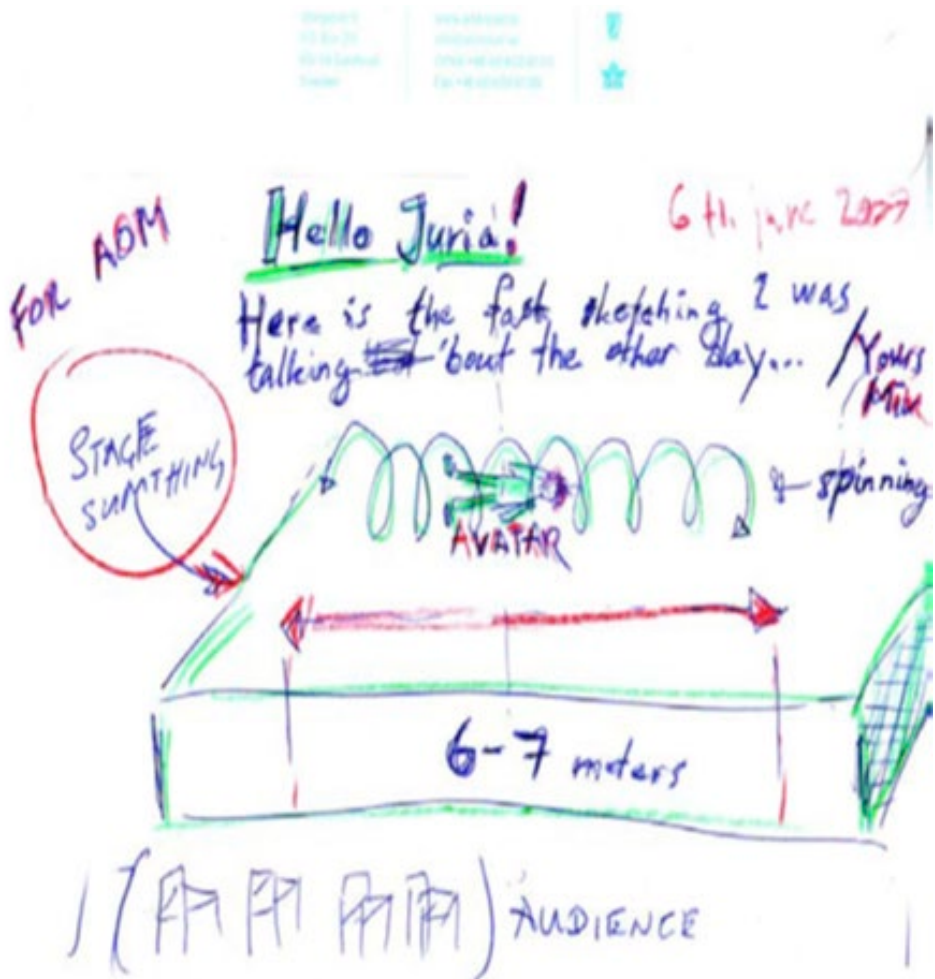


Figure 6. Draft by Björn Eriksson explaining the movement of the avatars in *Fragula*.

3.2.2. *Heart of Tones (HOT)*

Heart of Tones is a piece of Pauline Oliveros aka Free Noyes.

The blog of the orchestra collects that instruments, animation and AV receivers are designed and constructed by Andreas Mueller aka Bingo Onomatopoeia, and that it was dedicated in memory of Toyoji Tomita aka Toyoji MacDonnell.

The piece of mixed reality has counted with performers additional: Monique Buzzarte aka sum Noyes, Jen Baker aka Trombonejen Wigglesworth, Seattle Toyoji Band, with Thomasa Eckert, Janice Giteck, Roger Nelson, Paul Taub, Renko Ishida Dempster and Stuart Dempster touching across the avatar StuArtnoise Sass.

This piece was initially composed for trombone and two oscillators. It was commissioned by Abbie Conant and her Wired Goddess project during her residency in



Figure 7. Poster for Heart of Tones, with HuD on the left and *Bingo Onomatopoeia* and *Fernsing Lewellyn*. Source: Photography: *Bingo Onomatopoeia*.

1999 at Mills College, where the premiere of the piece was done.

This is an ensemble version of the piece adapted for the mixed realities of SL and Real Life, combining virtual instruments with live trombones and voices streamed into SL.

What follows is a description of the piece.

The Heart of Tones: A tone, in this instance, D4, is minutely explored in the smallest possible increments on, above and below the prescribed pitch, through the smallest timbre variations and spatial locations by performers on virtual and physical instruments.

The pitch variations are never more than a half step away from the given pitch. The resultant beats, timbral shifts and audio illusions create rhythms, transformations and textures of depth. The focus is on listening to the acoustic beat frequencies and the overtones that result from playing tones together that are very very close together in frequency.

The musicians decide independently and intuitively on the variations.

4. Conclusions and Discussion

The practice of an investigation focused on the virtual environments has consequences on the physical environments. This is also shown in the studies of Sharma, Qianj y Wenjun about the consequences in “real life” within the business that take place in SL [10]. Moreover, it also matches with the idea of presenting SL as a space of creation and avant-garde [11]. Some compositions of AOM resembles some pieces of composers of the post-war period, such as Xenakis or Stockhausen [3].

Attentive listening (self-listening/listening to others) in virtual environments, without the presence of a physical body, appears to show benefits regarding quality of

life and health, at the individual and social levels [3]. Omitting physical body appears to increase targeting auditory sense and the visual sense can be focused on one point [3]. The sense of smell and its relationship with virtuality shows individual differences of perception [3]. Given that emotions in the orchestra are mostly perceived from a mental construct, there are individual differences and extrapolation to the location of these emotions in the body [3].

There are also differences in the use of the avatar as a “physical copy of the body”: some individuals build their avatar in terms of appearance and others do not [3]. This is significant, because it doesn’t agree with other studies reporting that avatars are designed as a copy of the physical appearance of the creator [3].

Despite the platform shows “lags” associated to connections, the Orchestra uses them as challenges that encourage the development of new artistic experiments [3].

AOM communicates above all by chat [3]. The auditory modality is often used to listening to their creative activity [3]. This fits the results of Annie Jin; textual form gives values more positive about the informative value of the message [12].

English is the chosen communication language between avatars of different mother language [3]. The *email*, *Skype* and *SL* are presented as places for sharing information in a safe way and with a quick replay [3].

Attentive listening and attention seem to side with the concept of FLOW in the case of subjects of the *AOM*, and seems to be linked with perseverance and long-term creativity development [3].

Group creative processes observed in the orchestra, a good communication, perseverance and creative freedom seems to lead to a “group FLOW state” [3].

We think the Orchestra is a good example of what Rabeler raises in her study, introducing a methodology for the creation of mixed realities according to colour and music [13].

All subjects showed empathy, positivism and social implications [3]. We think that this could be related with the fact that all of them are pioneers in their respective fields.

Acknowledgments

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