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DANCE AND NEW TECHNOLOGIES

Exploring the artistic potential of technologies

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THESIS
Abstract

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Abstract

The purpose of this study is to investigate new tools for the artistic expression, which allow artists to achieve more vibrant and fuller results in their creative process. The author will talk about new art forms in which technologies and art merge and create new dimensions of an artistic process. The author will discover if technologies can help to expand the accessibility aspect of the art, increase audience participation in art productions as well as will talk about what role technologies play in art documentation and preservation.

The study is based on authors professional education and experience as a dancer and dance teacher, experience from attending media art museums, exhibitions, dance festivals and live performances, course of Dance and New Technologies (professor Anouscka Brodacz) in Accademia Nazionale di Danza in Rome during authors Erasmus Exchange Programme in 2017, literature such as "Digital Performance. A History of New Media in Theater, Dance, Performance Art, and Installation." By S. Dixon (Leonardo Book Series) and "Performance and Technology. Practices of Virtual Embodiment and Interactivity" (edited by Broadhurst and J. Machon) as well as different articles and productions explored in Internet and other media sources.

In the first chapter, the author will talk about her point of view on artistic expression and why she got interested in this topic. The second chapter will include examples of technologies such as light, video projection, video mapping and motion tracking, artists and their productions, where these technologies were used.

The third part of the paper will discover Virtual Reality Technology with a more practical approach. The author investigates what is Virtual Reality and describes her volunteer experience at Loikka Dance Film Festival Virtual Reality Programme (Helsinki, 2018). In this part, the author will present technology with more details, such as different uses of Virtual Reality Technologies and equipment needed for creating Virtual Reality experience.

Keywords
New technologies, art, media art, choreography, dance, live performance, projection mapping, motion tracking, interaction, accessibility.

CONTENTS

1 INTRODUCTION

I can surely say, that my exploration of new technologies and dance started many years ago, while I was a young ballet student in Vaganova Ballet Academy and later in Saint-Petersburg Conservatory Ballet School. I was always fascinated with magic which happens on the stage with the help of choreographers, dancers, stage designers and technicians. I always kept careful attention to all the details: costumes, decorations, characters, lighting, and music – all of this is an essential part of the whole performance. Later, being a professional dancer, I developed an interest in creating my own movement phrases or dance pieces, but for some reason, I could not achieve full and rich expression of my ideas into the body and three walls of a dance studio. The main problem for me that time was lack of tools. For example, how can I create a feeling of flying and how can I make the audience to feel what I want to tell them?

At the beginning of 2010, when many people had access to smartphones, photo cameras and PCs, I got interested in photography, films and explored a smartphone with exciting applications for creating videos. I used those devices for my artistic expression in everyday life and also in a dance studio while improvising or just capturing some interesting moments during rehearsals or performances. Those experiments helped me a lot to add new dimensions for the movement, body, space and with the help of sounds effects, I got closer to the whole idea behind that video or piece I tried to create. About the same time, I discovered dance movies created with 3D Film technologies (Swan Lake 3D and Pina 3D) and videos made with a GoPro camera. I was surprised how video camera and 3D technologies helped to dive into the magical world of live performance and brought me closer to real experience. As an audience member on a live performance, you cannot always experience the same what you see and feel when the camera zooms in very close to the dancer, and you can see costume details, makeup, dancer's facial expressions and even sweat or tears. That time I understood that new technologies could be an excellent tool for creating and could solve some of the problems of an immersive aspect of the art performance, accessibility, and preservation of art.

During my studies in Savonia UAS and Erasmus Programme in Lisbon (Escola Superior de Danca) and Rome (Accademia Nazionale di Danza) I started to look for art and dance pieces, which stood out from, so to say, classically made ones. I attended some Dance Festivals, explored Lisbon and Rome for different Media Art exhibitions (ArtFutura in 2017) and participated in a Dance and New Technologies course in Accademia Nazionale di Danza (professor Anouscka Brodacz). I discovered an endless world of possibilities and stunning art pieces. All those steps made me very inspired and gave a specific idea for this study. I understood that we live in a time of significant changes - digital revolution and as artists, we are responsible for developing art field, keeping society interested in art and exploring new tools for artistic expression.

For this study, I looked for collaborations and courses in different schools, universities and studios and individual professionals, which specializes in new technologies. I discovered a Media Lab

Helsinki and Virtual Cinema Lab (both managed by Aalto University (Helsinki), Mediated Performance Design course in Uniarts Helsinki and contacted my friends in Institute of Animation in Germany and professor of Music Technology of Kuopio Conservatory Petteri Pyyny for possible collaborations or workshops. Unfortunately, my schedule did not allow me to accept some of the offers, and in February 2018 I discovered, that Loikka Dance Film Festival is looking for volunteers for their Virtual Reality Programme. VR Programme has consisted of performances, lectures, and workshops. I was thrilled to apply for this job because it gave me possibilities for more practical research as well as the opportunity to meet artists who merge New Technologies and art.

In my study I wanted to discover, how technologies can help artists to achieve more vibrant and fuller experience in their works; wanted to find the dialogue between technologies and movement and technologies and art; wanted to find an answer, if technologies can increase audience participation in art practices and also would like to explore how technologies can help artists preserve their works without losing its original form.

2 ART AND TECHNOLOGIES

Both technology and art define and continue to reshape the world we live in (Andrey and Silka 2017.) I very much agree with this idea, and in this chapter, I would like to talk about the artistic values of technologies, and influence, which technologies made on art throughout history.

Theatre and technologies walked hand in hand since the beginning of times. As Gever (2012) points out, throughout history, technology has provided artists with new tools for expression and allowed entirely new art forms to evolve. Dixon (2007, 40) states, that for centuries dance has been an intimate marriage with music and has included the visual elements of sets, props, costume, and lighting to enhance the body in space. "Using new technology to further expression has always been the realm of the artists" (Coniglio 2011, 80). Dixon (2007, 80) also finds, that new technologies influence on the arts, aesthetics, creativity, and culture has been no less revolutionary, significantly affecting processes and production to creative writing and the visual and performance art.

Technology has been used in ways that have created incredible visual and auditory effects: from the early plot device Deus ex Machina, to the guild-produced Medieval pageant wagons, to the innovation of perspective painting and mechanical devices on Italian 16th Century stage sets, to the introduction of gas, and later electric, lighting effects, to the modern use of computer to control lighting, sound and set changes (Dixon 2007,40).

The origins of new media art can be traced back to the experiments with moving images of the late 19th century. Early new media practice is considered to be the various kinetic and light artworks from the 1920s through the 1950s; later we saw experiments with video and multimedia performances in the 1960s, computer graphics and forms of multimedia in the 1980s, real-time-based technologies in the 1900s, and to-day web art, net art and various forms of interactivity and connectivity. Indeed the term is used to describe or includes any number of genres: computer art, web art, digital art, visual art, gaming art, device art, computer animation, media installation, computer robotics, bio-art and more. (New Media Art Practice and Technology 2016.)

One of the most famous dance artists and pioneers, who made technologies an essential detail of her performance, was Loie Fuller. "Theater-based performance, that incorporate digital media and computer-generated projections have a long historical lineage stretching back around a hundred years to Loie Fuller's experiments with projected film on her diaphanous robes, and the first integration on film within theater performance, during a lighthearted Berlin revue in 1911" (Dixon 2017, 10).

> The dancer Loie Fuller provides an interesting example, undertaking some extraordinary experiments from 1889 with the then "new technology" of electricity. Like today's digital dance artists, Fuller diminished the fleshiness of the body in order to transform its materiality (or to make it immaterial) and render it like a metamorphosing, liminal trace. (Dixon 2007, 40-41.)

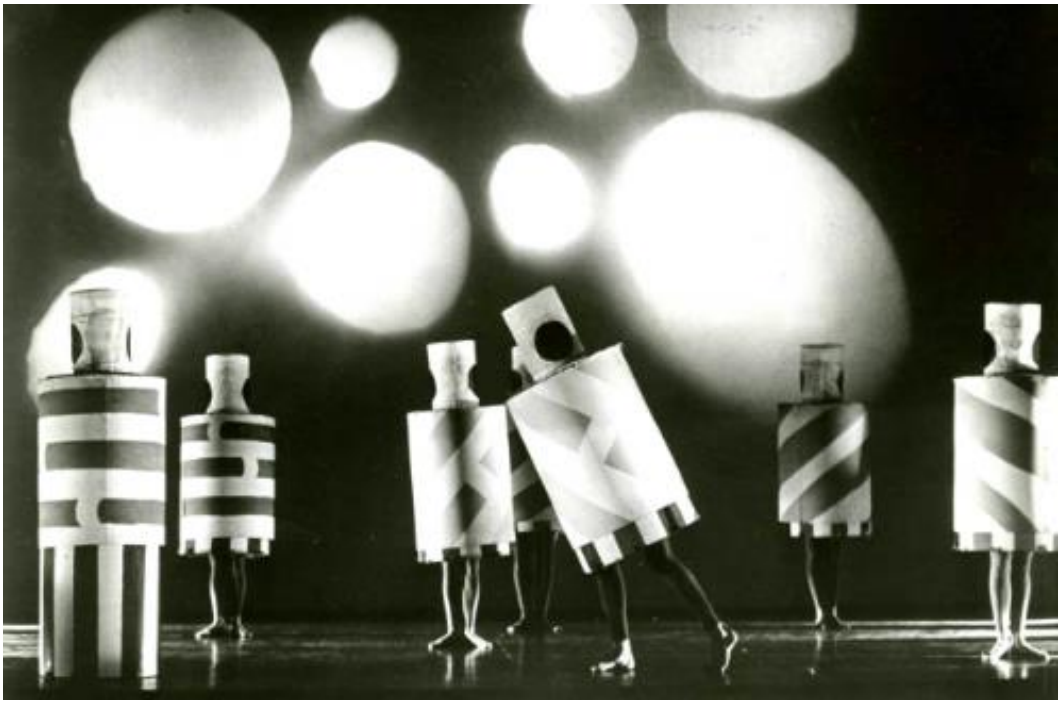


Image 1. *Galaxy,* Alwin Nikolais. Screenshot by author (Bearsnstow Journal).

Choreographer, composer, and designer Alwin Nikolais is one of the biggest inspirations for me. His experiments and abstract ideas on art, body, and movement are very close to what I find an interesting and fascinating form of artistic expression. Nikolais' 1950s choreography introduced dance to the era of modern multimedia theater. He designed and often made costumes, constructed props, set lighting, composed the music, and operated or cued the technical effects for each performance. Further, he explored the use of props and costume as a "means of extending the body as an abstract protagonist." (Bain 2012). In *Galaxy*, 1965, Nikolais made extensive use of blacklight: ultraviolet light enabled him to create moving elements without revealing the mechanics of the motion (Historical Photos).

Merce Cunningham was one of the famous artists who experimented with movement and new technologies for his works in the middle of 20th century. According to Dixon (2007, 188) in choreography Biped, created in collaboration between Merce Cunningham, Paul Kaiser, and Shelley Eshkar, artists used motion-capture techniques to map in three dimensions the movements of three dancers performing some twenty Cunningham movement sequences in a studio. After computer manipulations on data, they created complex and beautiful hand-drawn figure animations performing the same dances. During live performance projections were cast onto a front scrim, allowing the live dancers to appear to interrelate with the virtual dancers in various abstractions and spatial configurations. (Dixon 2007, 188-190.)

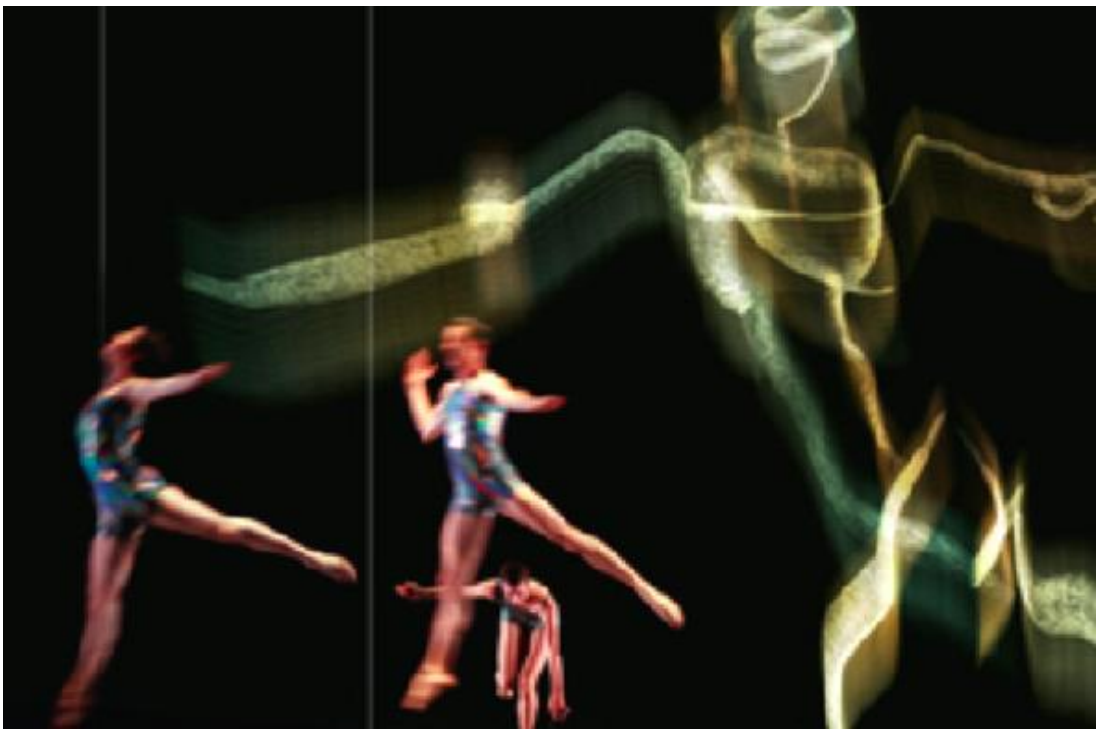


Image 2. *Biped*, Merce Cunningham, 1999. Screenshot by author (Alvarez 2014).

Since the 1960's the term, new media art was coined, and it was used to describe practices that apply computer technology as an essential part of the creative process and production. Placing the term under a vast umbrella known as new media, computer production, video art, computer-based installations, and later the Internet and Post Internet Art and exploration of the virtual reality became recognized as artistic practices. (Andrey & Silka 2017.)

Dixon (2007, VII) points out that during last decades of the twentieth century, computer technologies played a dynamic and increasingly important role in live theatre, dance, and performance; and new dramatic forms and performance genres emerged in interactive installations and on the internet. Broadhurst (2011, 141) believes that, as a result of these technological advancements (motion capture, artificial intelligence, and /or 3d animation), new liminal spaces exist where there is a potential for diverse creativity and experimentations.

2.1 Artistic potential of technologies

Over the past decades, we could observe a fast development of technologies as well as a rapid increase in their accessibility. Almost everyone has access to a personal computer, smartphone, different soft-wares and applications allowing us to experiment with photography, video making and, of course, artists to experiment with technologies in their creative process.

In this chapter I would like to talk about the artistic potential of different technologies I found interesting and useful. I will present examples of contemporary choreographic pieces in which these technologies were used as a tool for expression or essential detail of the artistic research.

2.1.1 Light

Light is one of the very first and oldest tools to be used on the stage. According to Wikipedia (2018a), the earliest known form of stage lighting was in the early Grecian and later the Roman theatres. As theatres were mostly roofless or had a large opening on top, the light was natural sunlight. When theatres moved indoors, artificial lighting became a necessity, and it was developed as theatres and technology became more advanced (Wikipedia 2018a).

Nowadays technologies are so advanced that choreographers and stage designers can use light not only as a supporting detail for live performance but make it an essential part of it by experimenting with its depth, colors, structures, and shapes for creating new dimensions, levels, and layers and change the space of the performance. "Lighting is not just a simple matter of illumination, but it's about using light in a way that enhances what on the stage and created the right mood for each component of the story "(Stage Lighting & The Psychology of Color- Stage Electrics 2016). Lighting designer Michael Hulls believes dance and light enjoy a special kinship, thanks to their shared ability to dramatize space and convey nuances of emotion and Mackrell finds that it is sometimes impossible to separate the movement from the light in the works of the choreographer Wayne McGregor, who regularly collaborates with lighting designer Lucy Carter (Mackrell 2014).

One of the most exceptional examples of light being an irreplaceable part of the performance, we can see in some of the works of Pilobolus Theatre. For instance, *Shadowland* combines multimedia, projected shadow play and front-of-screen choreography (Shadowland). Shadowland is one of the first pieces which showed me how technologies could expand the use of space and possibilities of presenting a human body on the stage in a new way.

Image 3. *Shadowland*, Pilobolus. Screenshot by author (Pilobolus).

Another great example how light can be the only visual tool for creating an unbelievable atmosphere, playing with levels and dimensions in the space, is the piece *SKALAR* by Christopher Bauder (in collaboration with Kangding Ray). "In *SKALAR* light is treated as a solid material that can be sculpted and shaped to architectural dimensions, evoking abstract emotional associations "(SKALAR).

Images 4 and 5. *SKALAR*, Kraftwerk Berlin (Susi 2018-2-9).

I have seen *SKALAR* in Berlin (Kraftwerk Berlin) in February 2018. It was a fantastic experience to see this installation live. The light, colors, and music created a feeling of floating in open space. *SKALAR* was a great example of how with only simple tools we can develop dimensions, levels, and depth in the space. This piece very much inspired me, and in my opinion, such type of lighting could be a fantastic opportunity for a dance performance as a part of stage design or storytelling. You can see some extracts from my experience of *SKALAR* by the link below: https://youtu.be/iZq0q8Fa09s.

Technologies have developed so far, that nowadays we can even create objects with light. Such techniques are possible with creating holograms. According to Seppala (2014), there are examples of an older method called Peppers Ghost developed in 1863, but the newer techniques give us better possibilities to create 3D holograms, which are arrays of lights projecting a 3D image that's viewable from all sides. As Seppala (2014) explains with computer-generated or HD video capture holograms and digital light processing projectors, we can create shapes and objects. Wilson (2007) explains, that if you look at holograms from different angles, you see objects from different perspectives, just like you would if you were looking at a real object. "Some holograms even appear to move as you walk past them and look at them from different angles" (WILSON 2007).

I think, holograms are an excellent tool for creating objects and layers on the stage, for bringing more depth and dimensions for a dance piece: we can create a room, cloud, rain, animals or moving human body and use them as a part of a design or even as a dancer or character in our narrative. You can see an example of holograms in a dance piece called *7 questions to Yourself* created in collaboration with Sila Sveta (an interactive media, production, and conceptual design company) and Department Creative Marketing agency. Ballet dancer Denis Medvedev moves among holographic stars and his two doubles (Sila Sveta a).

Images 6 and 7. *7 questions to Yourself* (perf. Denis Medvedev). Screenshot by author (Sila Sveta a).

2.1.2 Video

One of the most familiar to audience technology, which can be applied both, for the creative process and as well for a documenting the movement, is a video recording. Cook (2011, 33) mentions choreographic and cinematic collaboration began over 110 years ago. In my opinion, it is hard to imagine the dance world nowadays without video technologies. Choreographers wouldn't be able to record their creative process for future research or the final result of their works, dancers wouldn't be able to learn choreography, which was presented in the past, and dance history would be very different without us being able to see performances and documentaries about artists from the 20th century.

There are many examples of a video recording of dance performances which inspired many people to become dancers, as well as films made about dance. Many artists create dance films as the primary form of their artistic work, and there are many festivals around the world, such as Loikka Dance Film Festival in Helsinki, which specializes in dance film industry.

Image 8. Ballet Film *Spartacus,* Mosfillm, Bolshoi Ballet (dir. V. Derbenev, 1977). Screenshot by author (Spartak, Grigorovich 1977).

Image 9. *Flashdance* (dir. A. Lyne,1983). Screenshot by author (Tielman).

As Cook (2011, 33-34) points out, "filmic kineticism extends our engagement by linking the visual and somatic phenomena of performance from both the dancers' and audience's perspectives." He explains that the camera functions not only to capture or record images but also to increase the kinesthetic exchange between audience and performer. It happens by camera performing as a double role, one as an extension of the spectators' visual sense, and secondly, as an apparatus that engages their tactile sense. (Cook 2011, 33.)

Images 10 and 11. *Rag & Bone* Men's Fall-Winter 2015 Film feat. Baryshnikov and Lil Buck. Screenshot by author (Art Department 2015).

List of choreographic pieces created with a video recording is very long, but here are examples of the ones, which inspired me to experiment with video technologies. The first piece is a short film made for a *Rag & Bone* Fall /Winter 2015 Men's Wear Collection with dancers Mikhail Baryshnikov and Lil Buck. Video directing and editing in this film presents narrative and movement in a very interesting manner by adding slow motion effect and sharpness to the movement, focusing on specific body parts or repeating and multiplying images and movements (Images 10 and 11). Such results cannot be achieved on the stage with just human bodies. You can see the whole video by the link below:
https://vimeo.com/118830140

Another example of how video technology can enhance the main idea of the movement and it's stimulus is the video *Lectures from Improvisation Technologies by Willam Forsythe* . "The animated lines and other graphical effects that annotate the sequences demonstrate Forsythe's view that certain classes of movement can be analyzed as geometrically inscriptive – a formal drawing with the body in space" (Forsythe). I find that these improvisation methods would not be as robust as they are without a video recording and editing, due to editing playing an essential role in enhancing the specific perception for the viewer or dancer, who follows Forsythe's improvisation tasks.

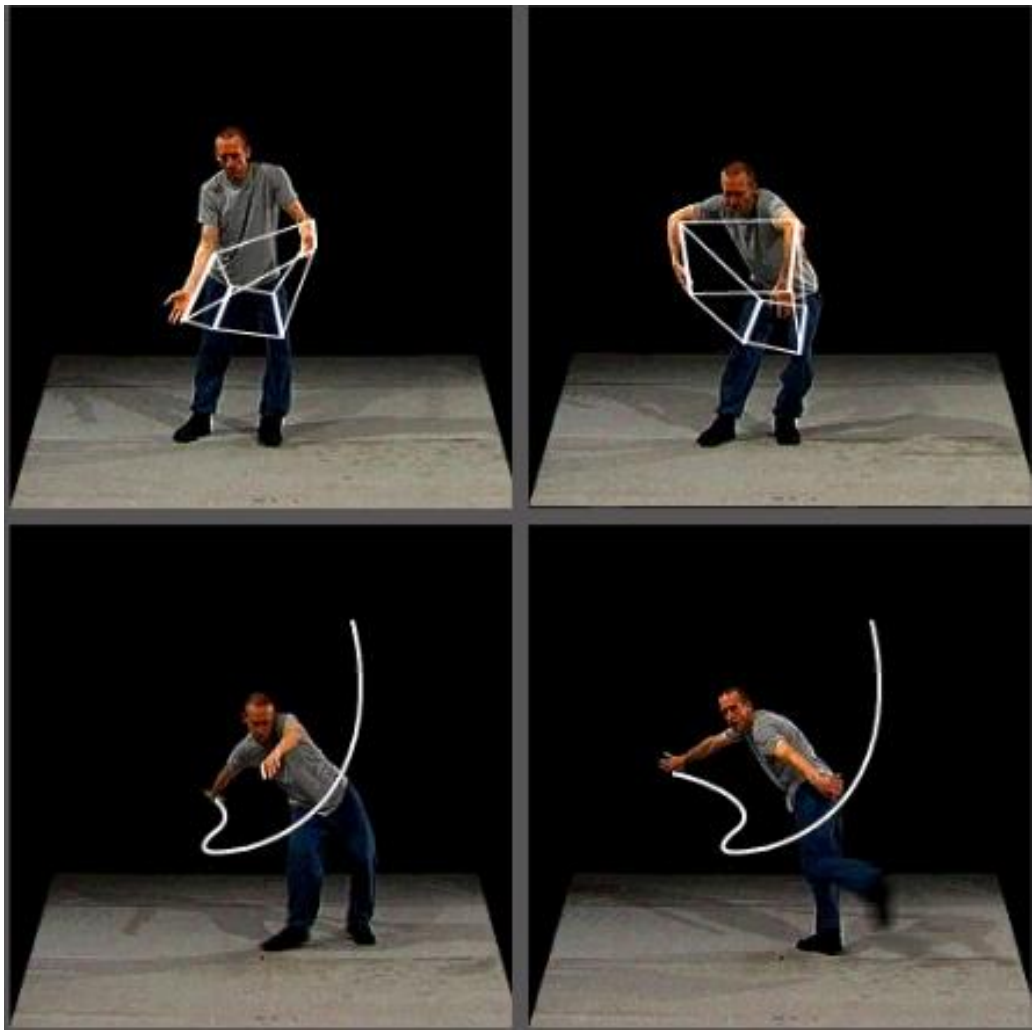


Image 12. William Forsythe improvising. Screenshots by author (Forsythe).

Nowadays video recording and video editing are very simple and accessible tool. As I mentioned before, most of the smartphones and computers have software and applications, which can be used during the creative process or for further editing and experiments on a movement. I used application for iPhone such as GhostLens, Reverse, SlowMo and DefeKt for experiments on the movement and creating short choreographic pieces. It helped me to increase the imagination during the research and solved one of the problems of expressing feeling and ideas richer and fuller.
On image 13 you can see screenshots from an improvisation video I made with a smartphone and application GhostLense. I experimented on merging two or three video layers and fading them for a phantom effect.

Image 13. Screenshots from improvisation video, created with GhostLens for iPhone (2015-4-15).

For creating images 14 and 15, I used application DefeKt. It has different effects for video recording and photo editing. The effect you can see on the photos is called "Echo", and it creates an illusion of stroboscopic movement by multiplying body or body parts, depending on the movement. Applications or software like DefeKt can be beneficial for expressing the idea of a clone or a double, different body parts isolation or a liquid and blurry movement. A similar idea was showed in Bud Blumenthal *Les Entrailles de Narcisse* (2011), which Dixon (2007,51) describes as a "prismatic effects of a dividing and shattering body."

Images 14 and 15. Improvisation with DefeKt App for iPhone (Susi 2018-6-10).

2.1.3 Video Projection

Video technology can also be used on the stage as a narrative tool or as a part of stage design. It can be achieved by projecting the video to the stage, dancers or costumes. Such technology can not only add more atmosphere to space but, by experimenting with the video and canvas on which video will be projected, we can add more layers to space. In image 16 you can see an example of this effect.

Image 16. Experimentation during Dance and New Technologies course, Rome Accademia Nazionale di Danza (Susi 2017-5-20).

Dixon (2007,408-409) explains the effect of video projection to the stage in choreographic piece by referring to Bud Blumenthal and description of his *Riverman* (1999), where with special projection set-up the video image constitutes a moving surface supporting the dance and acts upon the dancers' bodies, transforming them, integrating them into its own structure and becomes a third partner: the sound, dance and décor move as one event. Dixon (2007,409) also points out that "circular overhead projections provide shimmering visual pools of rippling blue water and the dancers reminding underwater creatures."

In 2014 Nicole Seiler created an installation *Wilis*, which was made with 3D video projection and motion capture technologies (Wilis. Site Specific installation). The piece is an adaptation of classical, romantic ballet Giselle, and it was made to be shown in the forest with a video projected to the trees. In my opinion, this is an excellent example of how new technologies can be used for giving a new life to a classical piece, by bringing the character such as Wilis to their real environment (forest). "Pale and translucent shadows - the Wilis - the ghosts of deceased young brides are ready for revenge" (Wilis. Site Specific installation). Installation *Wilis* was presented to the students of Dance and New Technologies course in Accademia Nazionale di Danza by professor Anouscka Brodacz in spring 2017, during my Erasmus Exchange Programme in Rome. You can see the teaser of Wilis by the link below:
https://www.nicoleseiler.com/en/projects/wilis/#v1142

In December 2018 I attended a performance of *The Magic Flute* at Finnish National Opera. The classic masterpiece of W.A. Mozart had an entirely new form: the British theatre group »1927« created a very playful and beautiful fantasy world with animation projected to the stage. There were almost no decorations used, except for the wall, to which animation was projected. The wall was also a performing space for singers: it had floors, stairs, and windows. The wall and animation projected to the wall created effects, such as a character being trapped in a spider's web, flying like a butterfly or running away from animated dogs. Images 17 and 18 shows an example of different scenes from *The Magic Flute*. The concept of animated projections in this piece is an excellent example of how with a minimum of decorations we can transform stage and create such different illusions and worlds for every scene.

Images 17 and 18. *The Magic Flute* by Komische Oper Berlin. Screenshot by author (The Magic Flute).

One of my favorite artists, who experiments with merging dance and technologies is Klaus Obermaier. His brilliant *Le Sacre du Printemps* was made in collaboration with Ars Electronica Futurelab brings up for discussion of the complex relationship between music, dance, and space (Obermaier a). "3D space generated by musical impulses creates the framework for a narrative structure that is, in this particular case, also coupled with another means of expression: dance" (Le Sacre du Printemps 2006).

In a live performance while dancer Julia Mach moves along with the orchestra playing famous music Igor by Stravinsky, stereo cameras, and a computer software transfer dancer into a virtual three-dimensional space (Image 19). Obermaier (a) describes the result as "time layers, and unusual perspectives overlay one another and multiply themselves and enable an entirely new perception of the body and its sequences of movements." *Le Sacre du Printemps*, in my opinion, is an astonishing piece and an example of a combination of different technologies, movement, sound, and space creating such a fascinating, multidimensional world. You can see a teaser video of *Le Sacre du Printemps* by the link below: http://www.exile.at/sacre/index.html.

Image 19. *Le Sacre du Printemps* by Klaus Obermaier. Screenshot by author (Obermaier b).

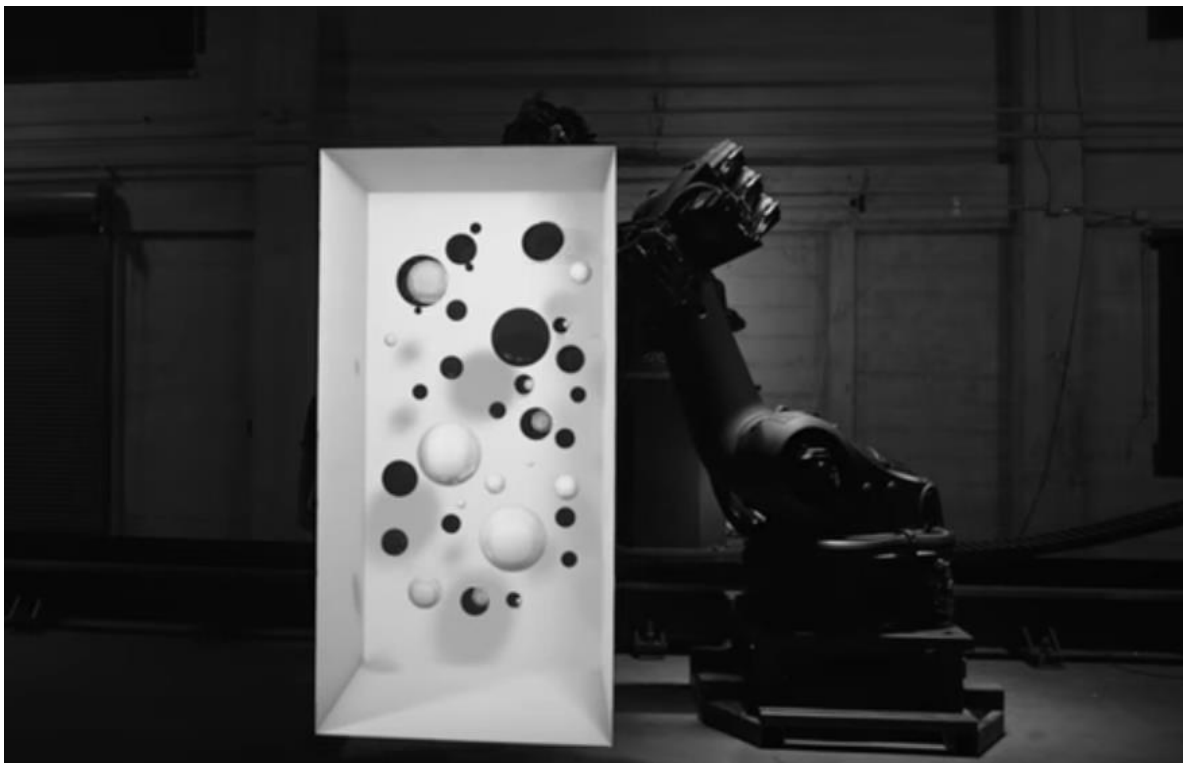
2.1.4 Projection Mapping

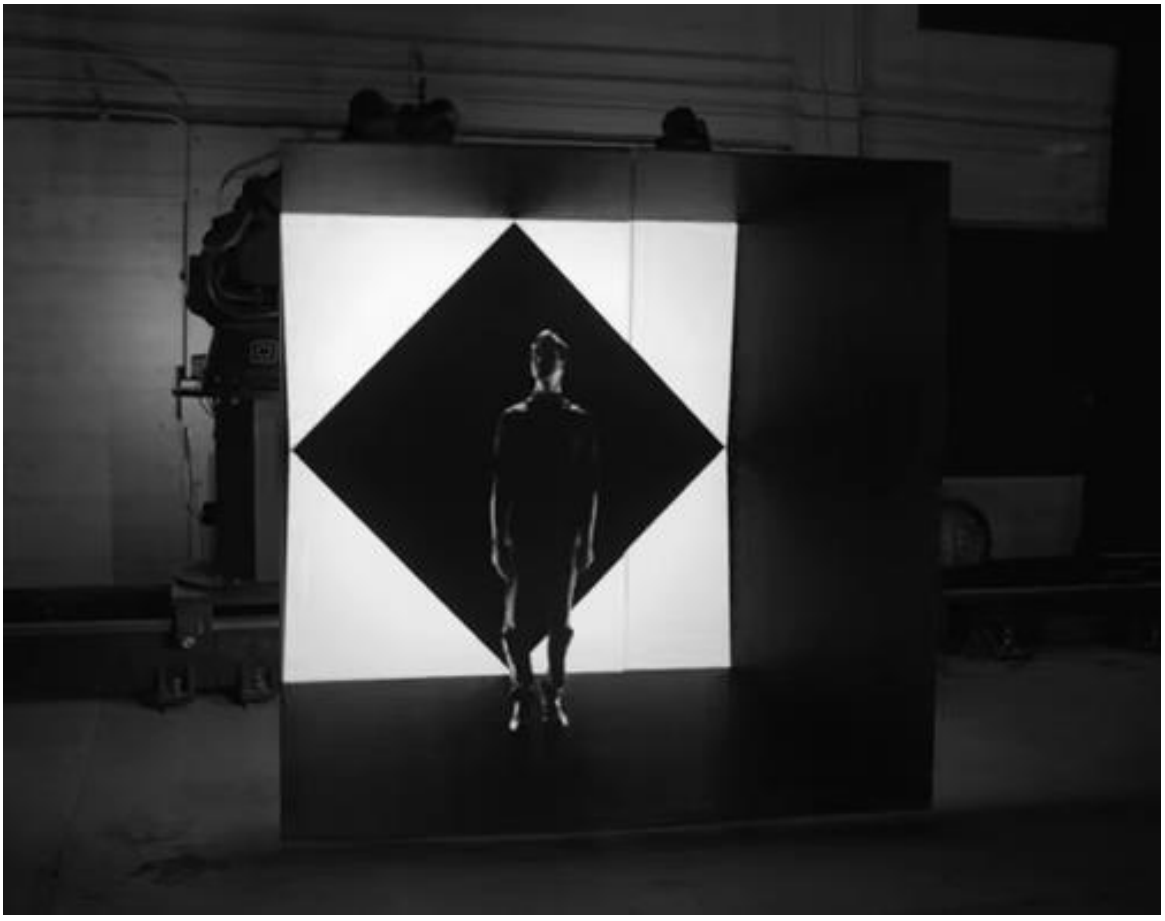
I have learned about Projection Mapping (or 3D mapping) after seeing the video of *Independent Day Celebration Show in Kharkov*, Ukraine (VJKHARKOV, 2010). City Council building suddenly appeared alive with doors and windows moving, giant fish swimming across it like in an aquarium and airplane flying out of the building towards the audience. It was a shocking and fascinating experience.

According to Jones, projection Mapping uses everyday video projectors, but instead of projecting on a flat screen , light is mapped onto any surface, turning ordinary objects of any 3D shape into interactive displays.

> Whether the objects are complex industrial landscapes, such as buildings, small in-door objects, theatrical stages or even multiple overlapping canvases, projection mapping changes the object's appearance in real time. It can add extra dimensions, optical illusions and notions of movement to previously static objects. (Prendi 2015.)

A great example of how a simple object can be transformed into different forms we can see in the project *BOX* created by company Bot & Dolly. "*BOX* explores the synthesis of real and digital space through projection-mapping on moving surfaces "(Creators 2013). 3D mapping creates an illusion of volume, depth, structures, and shapes on simple white canvases (Images 20 and 21). You can see the whole video BOX by the link below: https://www.youtube.com/watch?v=lX6JcybgDFo.

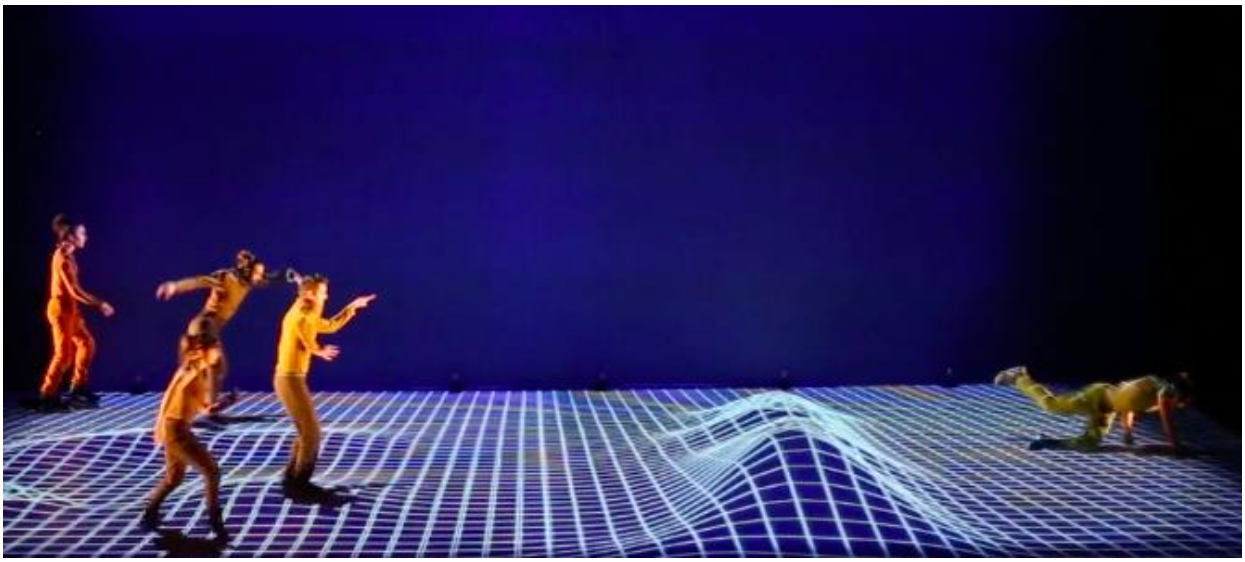


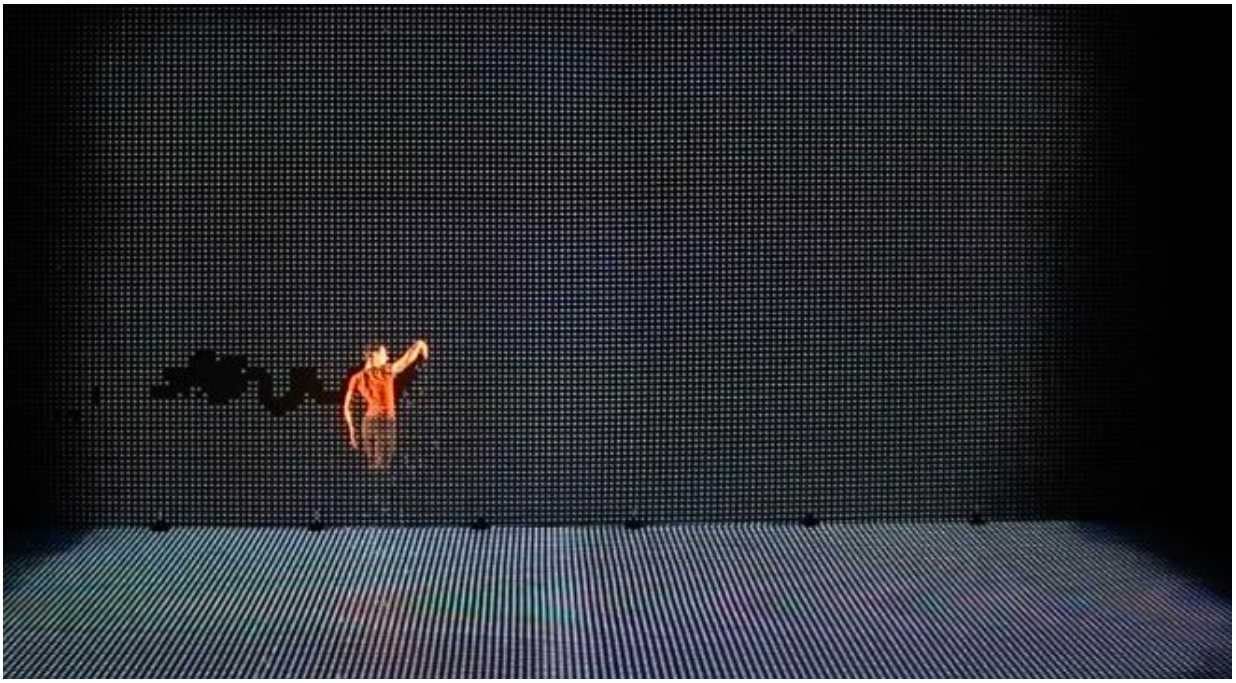


Images 20 and 21. Installation *BOX.* Screenshots by author (Creators 2013).

Similar effects were achieved in *Pixel* (choreographer Mourad Merzouki). "The hour-long performance incorporates a host of digital projection mapping techniques, 11 dancers, and bills itself as "work on illusion combining energy and poetry, fiction and technical achievement, and circus "(Jobson 2015a). Pixel is an excellent example of how in live choreographic piece stage can be

transformed into such different settings: walls and floor appear as living creatures, which changes along with movement and narrative (Images 22 and 23).





Images 22 and 23. *Pixel,* Cie Kafig (concept Mourad Merzouki and Adrien M). Screenshots by author (Jobson 2015a).

Choreographer Anna Abalikhina in collaboration with company Sila Sveta Studio created *Levitation*. In *Levitatio*n we can see a mesmerizing harmony between space and movement which is achieved with 3D mapping (Image 24). "We produced special graphics and used unconventional shooting angle to create an illusion of the dancer levitating in the air" (Sila Sveta b). Similar unity of movement and space I saw in a teaser video of piece *Hakanai* by Adrien M and Claire B (Image 25). "Adrien M / Claire B refer to *Hakanai* as a spectacle of dialog between dancers and digital scenography that surrounds it. White tulle is used to project images on the facade of the cube which entices the dancers to perform accordingly and are provided a constant transformation between the movements and visual spaces ". (Siddiqui.)

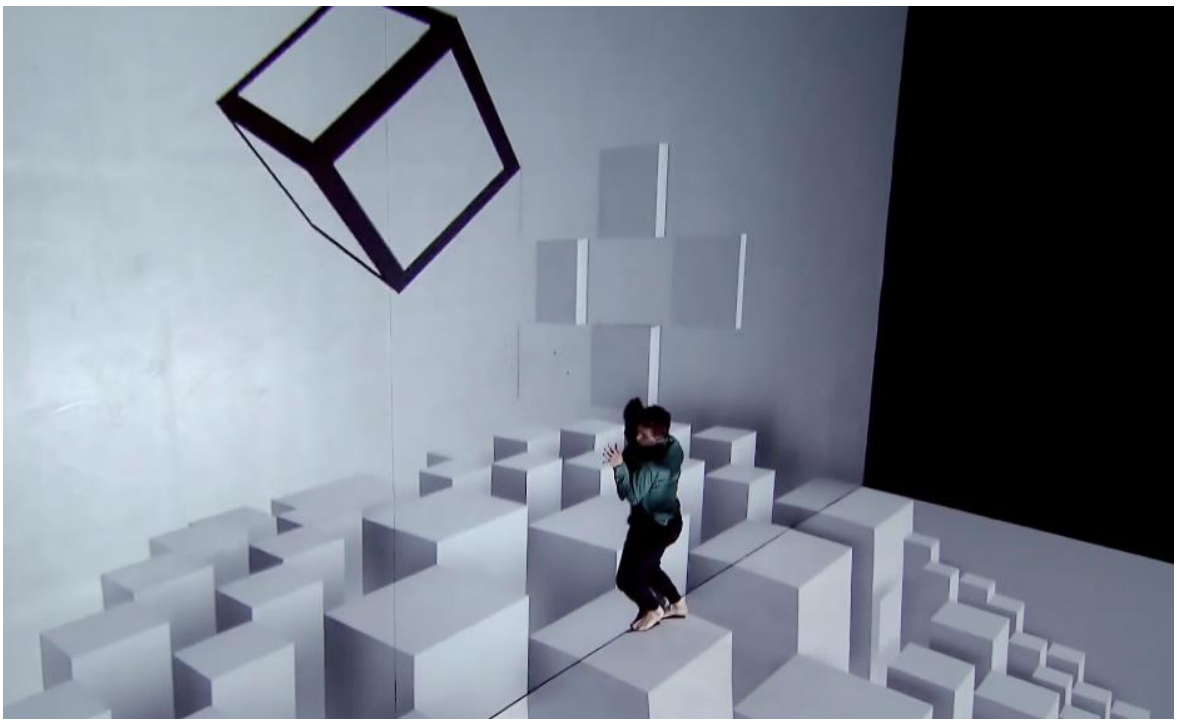


Image 24. *Levitation* (chor. Anna Abalikhina, danc. Jury Chulkov). Screenshot by author (Sila Sveta b).

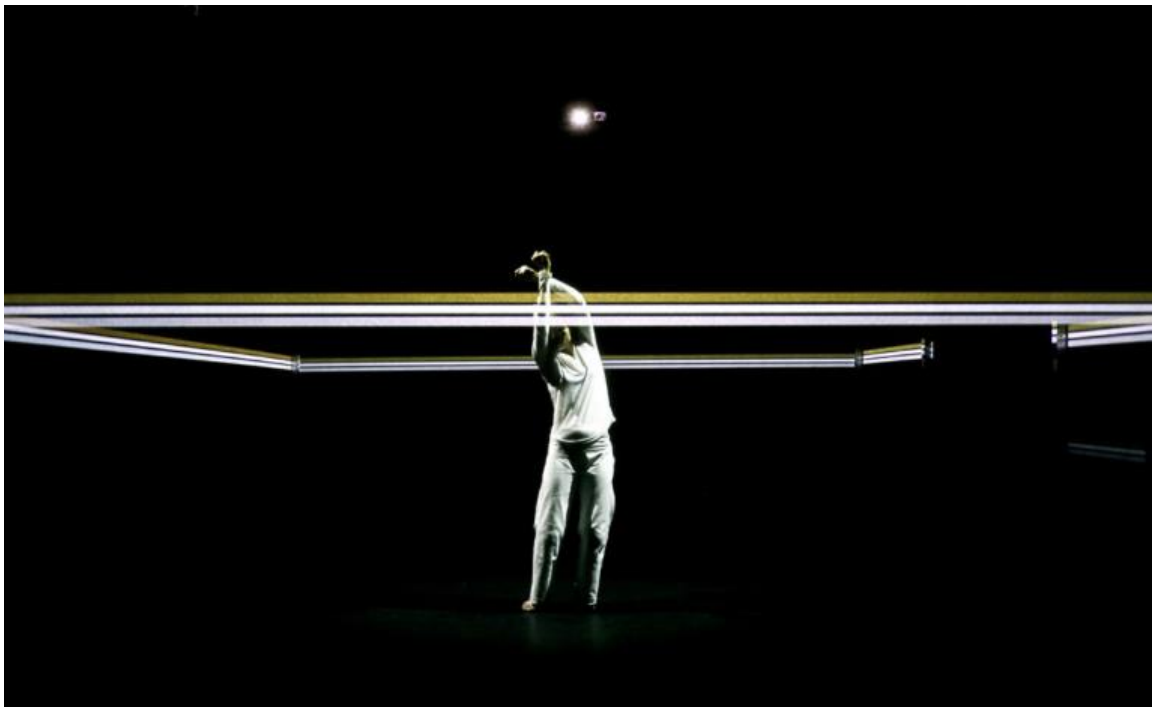


Image 25. *Hakanai* by Adrien m and Claire B. Screenshot by author (Siddiqui).

As I learned, in addition to spatial transformation, 3D mapping technologies can be applied to costumes and even faces. These practices, in my opinion, can change the physical appearance of dancers in a choreographic piece by experimenting with adding projections onto bodies or costumes.

According to Holmes (2015) and Pinar (2012), Designer Franck Sorbier blended fashion and technology in his Fall/Winter 2012-2013 *Haute Couture collection*, and in fashion installation created by designers Proforma (Nicola Buttari and Martino Chiti) for fashion label Drome, "glitchy visuals

react to sounds, changing patterns and formations on the surface of a white dress". According to Nobumichi (2014), Real-Time face tracking and projection mapping project *OMOTE* (Image 26) by Kuwahara Hiroto, Paul Lacroix, and Jin Hagesawa explores a theme of Japanese Identity. You can see the whole video by the link below: https://vimeo.com/103425574.

Image 26. *OMOTE* by Kuwahara Hiroto, Paul Lacroix and Jin Hagesawa. Screenshot by author (Nobumichi 2014).

2.1.5 Sound

In my opinion, sound and movement are inseparable elements of dance performance. Choreography can illustrate the music or, and on the contrary, soundscape can be an only a background for the visual elements of the piece. Technological development gave artists a wide field for experimenting with bringing out more artistic potential by extending the expression of the movement with the sound.

In 2017 performance in Sogaduko Hall (Tokyo University of the Arts) movement was translated into piano music. *Dance to Piano Performance System*, developed by Yamaha, detects the dancer's movements in real time by using four kinds of sensors on the dancer's body. Next, the system analyzes the information and translates it into a music data format (Yamaha Corporation 2018). The data then travels to a special hybrid Yamaha Disklavier piano (Interesting Engineering 2018).

Image 27. *Dance to Piano* Performance (dan. Kaiji Moriyama). Screenshot by author (Yamaha Corporations 2018).

In *Piano & Dancer* project choreographed by Muriel Romero mechanical piano embodies the expressivity of the dancer by becoming a sonic extension of the dancer's body activity. The physical gestures and movement qualities of the dancer are translated into music in real time by the instrument. (Palacio 2016.)

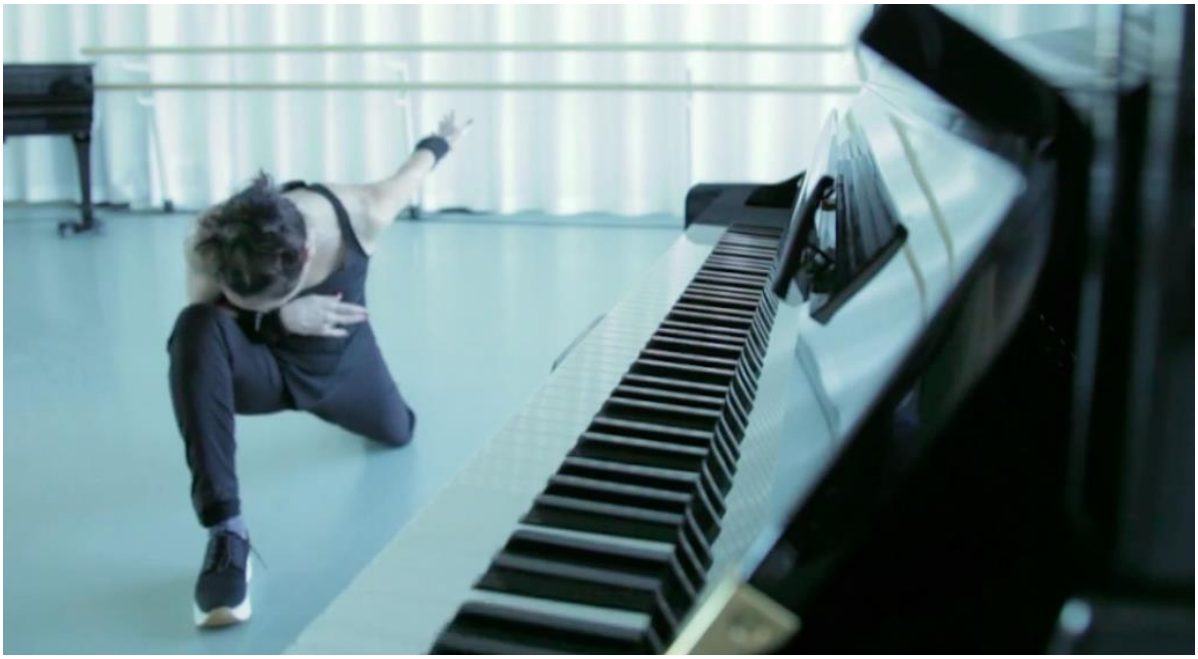


Image 28 and 29. *Piano & Dancer (*chor. and perf. Romero). Screenshots by author (Palacio 2016).

Chunky Moves Dance Company's artistic director Gideon Obarzaneks points out that his imaginative mind and the irrational world often doesn't reconcile with the tangible rational world he lives in. His avant-garde performances explore the tensions between the rational world we live in and richness of our imagination. (Poptech 2010.) Obarzaneks explains that in his piece Glow the laser system reads the information from the dancer and generates sound from that data. "In this synesthetic effect, the audience could really hear what movement looked like and see what sound sounded like" (Poptech 2010). You can see full piece Glow by the link below: https://www.youtube.com/watch?v=2AautwIOON8.

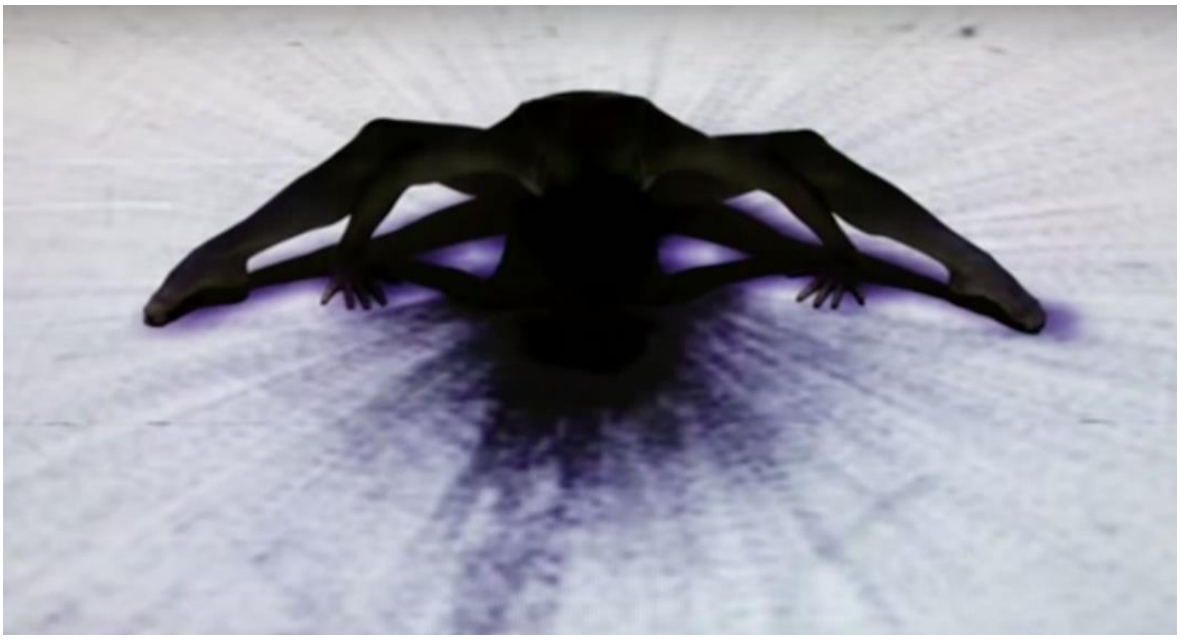


Image 30. *Glow* by Gideon Obarzaneks. Screenshot by author (Cultureband 2015).

2.1.6 Motion Tracking

According to Wechsler (2011, 60) using human motion in performances to control sound (e.g., music) and images is as old as theatre itself. Ancient Greek theatres employed elaborate mechanical stage devices to amplify the gestures of performers (Wechsler 2011, 60). Technopedia explains, that motion tracking tracks the movement of objects and transfers the sensed data to an application for further processing. Most common use of motion tracking many of us have seen in animated movies or video games. Motion tracking can be used in performances and installations and also control sounds, music, recorded or projected text, video art, stage lighting (Wechsler 2009.)

By the link below you can see how motion tracking and motion capture systems in action: https://vimeo.com/121436666. The Making Of video shows how the piece *Asphyxia* was created. *Asphyxia* is an experimental film project by Maria Takeuchi with Frederico Philips that explores human movement through motion capture technology (Jobson 2015). The result, in my opinion, is very dynamic and hypnotizing. You can see the whole film on the official website of the project by the link below: http://www.asphyxia-project.com/film

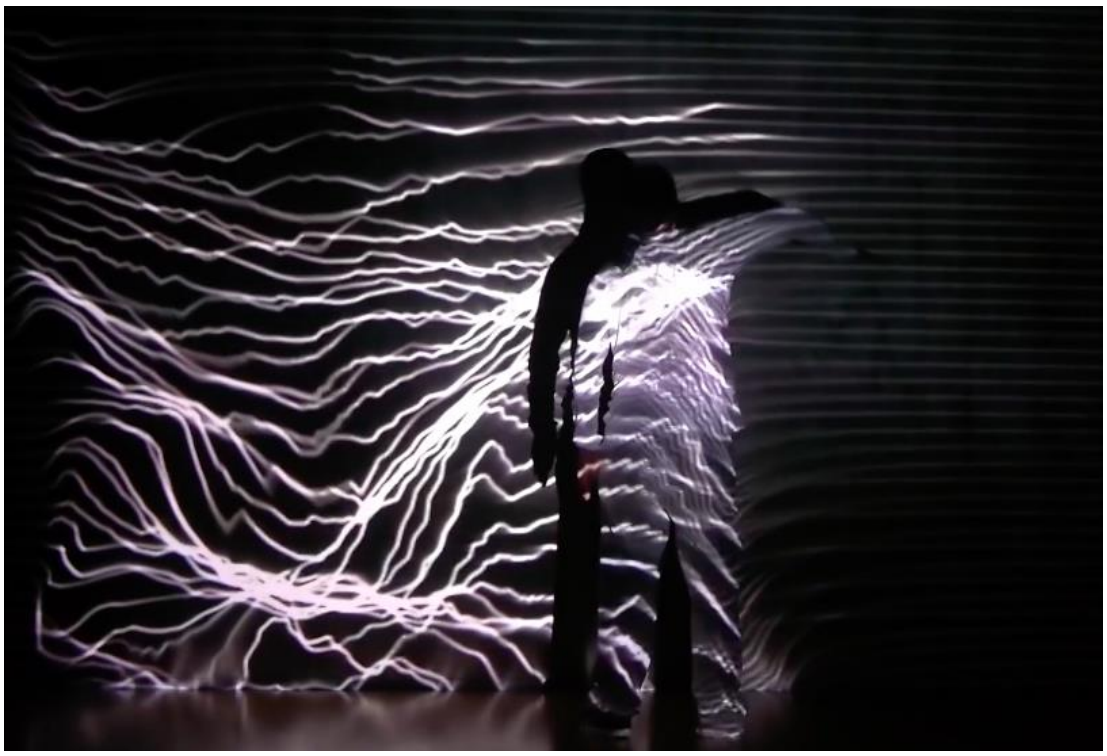
Image 31. *Asphyxia* by Maria Takeuchi and Federico Philips. Screenshot by author (Jobson 2015b).

Dixon (2007, 197) talks about Isadora software, which was developed by the artistic director of Troika Ranch Company Mark Coniglio. The software is an interactive media playback platform, which combines a media server, a visual programming environment, and a powerful video and audio processing engine (Isadora: Out-of-the-box Functionality, Outside-the-box Creativity). Cognilio

(2011, 81) brings an example from *16 [R]evolutions* he made in collaboration with Dawn Stoppielo, using Isadora software with combination of Eyesweb and motion tracking input devices: traces of the performers hands and feet leave multiple curved white traces which are projected to the stage and dancer (Image 32).

Image 32. *16 [R]evolutions* by Dawn Stoppielo and Mark Cognilio. Screenshot by author (Troikaranch 16 [R]evolutions (2006).

The similar idea was expressed in an interactive performance *Reboot* created by Waltz Binaire studio. According to the official website of the studio in *Reboot*, a kinect camera captures the dancer's movements and captured information is displayed as an interactive graphics (#REBOOT). On images 33 and 34 you can see how dancer's movements change the projections. *Reboot* and *16 [R]evolutions* are great examples of how the movement with the help of motion tracking technology can impact on the environment, and therefore make the space of performance more live and dynamic.



Images 33 and 34. *Reboot* by Waltz Binaire Studio. Screenshot by author (#REBOOT. Produced for Diesel s Reboot Campaign and performed at the Schauspielhaus Frankfurt).

2.2 Audience participation and interaction aspects

During my ecploration I have noticed an important detail: many of the art pieces I discovered share the aspect of participation and interaction. I can surely say that new technologies attract an audience to art, increase the participation and give the viewer the power to effect on the piece or even create the experience him/herself.

According to Carson (2011, 181), digital technology and internet allow for a democratization of the producer/audience member relationship, and increasingly, it is possible to think of the two-way form of communication which extends beyond polite applause within the theatre building. She brings an example of a digital audience interaction project Adopt an Actor. This online education project was run by Shakespeare's Globe Theatre and involves student groups being assigned to a particular actor for the duration of the rehearsal process. Video conferencing and virtual access to Globe Theatre allows students (within the project) to follow an actor's experience as they create a role from the first day of the rehearsals to the final performance and come up with suggestions and comments for his/her character. (Carson 2011, 189.)

3D technologies, which are used in filmmaking and performance video recording, give a viewer a deeper experience of the performance. For example, the illusion of space created around the dancers in Matthew Bourne's *Swan Lake 3D* allows the audience more in-depth into the action: the movement and speed of the dancers, filmed from high above to uncomfortably low down, brings tension and immediacy (Ward 2011.) Cook (2011, 33) points out that in video recording the camera functions not only to capture or record images but also to increase the kinesthetic exchange between audience and performer.

As I learned, some installations with holograms or video mapping can be viewed from different angles, and a motion tracking system can be used for creating a visual projection. As a result, these pieces engage the audience to be active and explore the space or objects around them.

> Because the viewers are responsible for generating and/or processing imagery in real time, each material manifestation of these installations is unique, a never-to-be-repeated event. In the immersive interactive installation, the participating "viewers" themselves become active elements in the installation environment (Rubidge 2011, 112).

According to Schiller (2011, 100-102), within the context of *Trajets* installation, both the general public and screens become dancers or players: together, the screens, images and the visitor dance and occupy the same artistic moving space. As the viewer/player moved through the space, the screens moved (and danced) with a life of their own (Art Expo). Schiller (2011, 101) explains, that to achieve such an interactive dynamic, this installation integrates a variety of techniques including movement mapping, expressive screenography, and principles of cinedance.

Interactive wall installation *&&Float* is another example of how the audience can create an art piece by themselves: when people enter the projection area, the system tracks motion and generates real-time art/graphic, which is projected onto a wall (Mankad 2009).

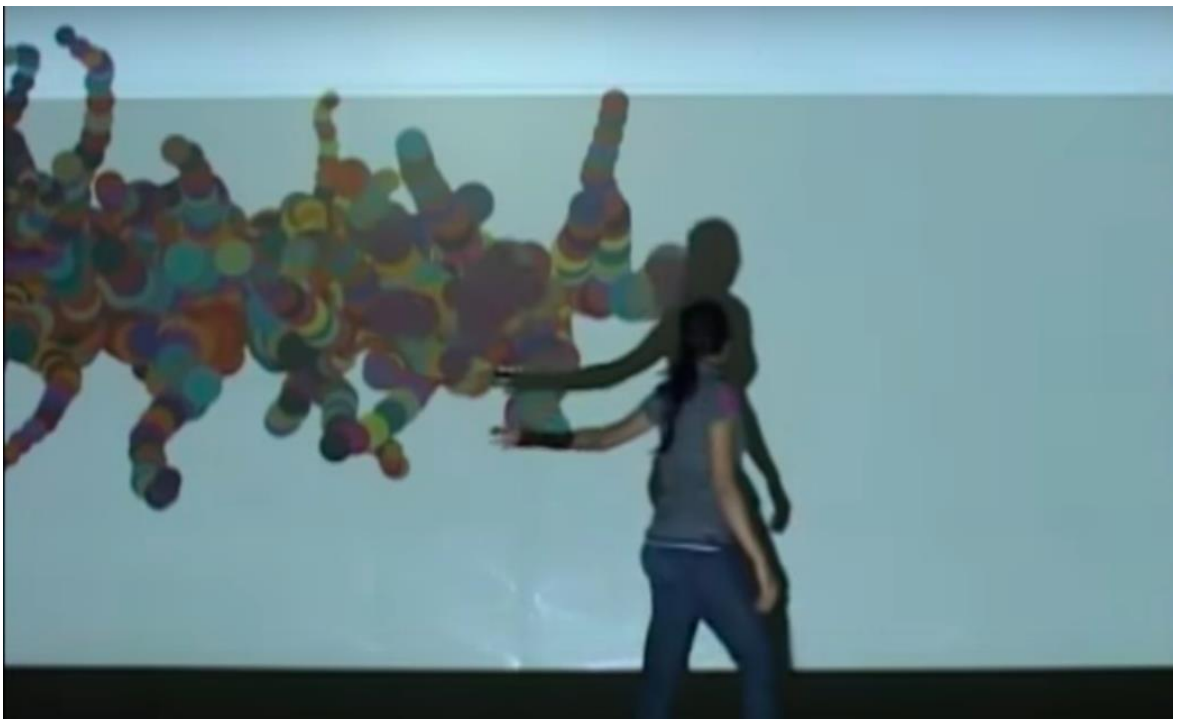


Image 35. Interactive installation *&&Float* by Siddhart Mankad, Sunil Vallu Aashka Shah. Screenshot by author (Mankad 2009).

Installation *Cave of Sounds* gives audience possibility to be active explorers and create their own music or sound. The eight instruments are arranged in a circle facing inwards: each can be approached and played by audience members, and any number can be played together (Cave of Sounds). In my opinion, this installation increases participatory work, collective feeling and make people move: for example, instruments are triggered by movement of hands, whole body movement or by participant casting shadows on the surface of the instrument.

LINES is another example of an interactive sound installation created by Swedish composer Anders Lind in 2016. According to VoiceofU (2016) lines attached to the wall, on the floor and hanging from the ceiling in combination with sensors and electronics are forming three novel music instruments: by touching the lines on the walls with hands or walking on lines audience can create sound, moving hands up and down change pitch of the sound (Image 36). Different variations of the movements can create harmonies, change tempo and dynamic of the sound (Image 37) or create poly-tempic patterns by performing in a group (VoiceofU (2016). I find that *Lines* not only invites the audience to explore the space around them but also increases the creativity of movement exploration as well as it's connection to the sound.

Images 36 and 37. Interactive sound installation *Lines* (Anders Lind). Screenshots by author (VoiceofU 2016).

2.3 Documentation and accessibility aspects

One of the most critical issues of my study are aspects of documentation and accessibility.

> It's the difference between dances that are gone-as-soon-as-they-exist and accessible by an elite few and dances that exist in perpetuity and can be accessed with near universality. Dance may be a time-based art, but it can now be made to exist in the past, present and future simultaneously - danced in not three dimensions, but four. (Dance Magazine 2014).

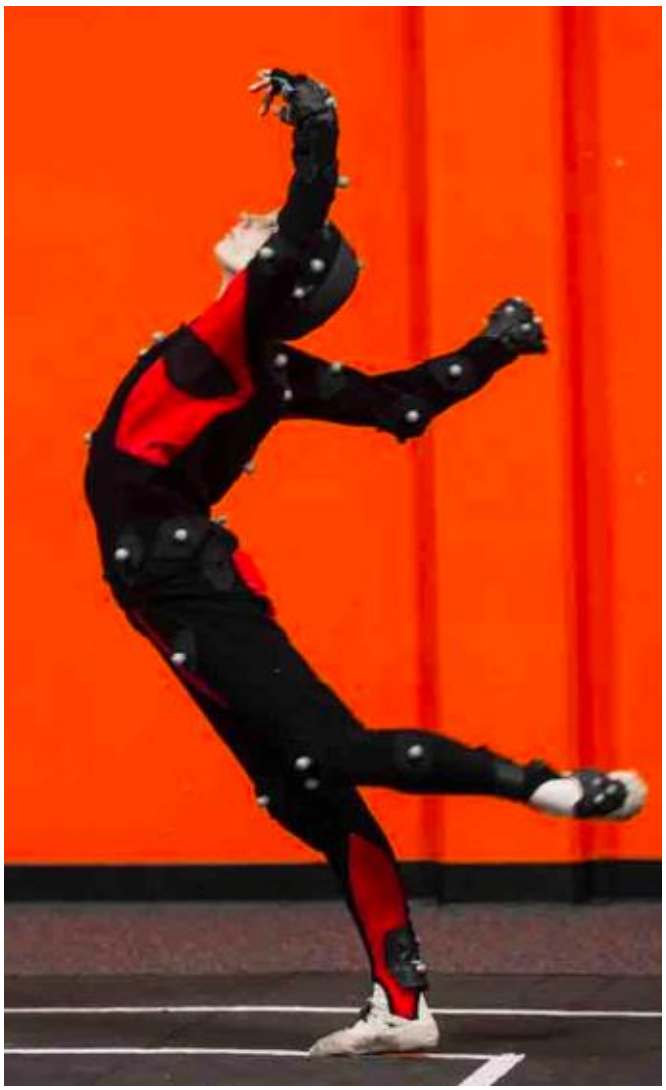


Image 38. Maria Kochetkova in a motion-capture bodysuit. Screenshot by author (DanceMagazine 2014).

As I learned, technologies not only extended the artistic expression of the movement but also played a considerable role in the issue of accessibility by bringing the possibility of showing theater, ballet and opera performances in cinemas around the world. These solutions brought more audience closer to art regardless of geographic or time aspect. The camera offers views of the dance from the variety of positions unavailable to an audience during the live performance and enables the choreographer to relocate the dance physically and kinetically in space and time (Cook 2011, 33-35).

In my opinion dance movies made with 3D technologies (*Pina 3D* and 3D recording of *Swan Lake* 3D of New Adventures Company) are examples of documentation, preservation and immersion aspect: both pieces will remain in their original form in 10, 50 and even 100 years from the moment they were created. As I learned, holograms and video projections, as I mentioned earlier, can be presented almost anywhere, not only on the stage of the theatre. Therefore, a choreographer creating his/her piece can bring dancers in holographic or video projection form out of the theatre and make his/her piece more accessible for the audience.

Video recording and motion capture technologies gave choreographers and dancers possibilities to record their choreographic experience with more details and therefore, they can be used for educational purposes. For example, both technologies were used in the William Forsythe Company Motion Bank project, which worked with artists to make their diverse choreographic approaches accessible in new ways through the digital medium (MotionBank). Choreographic Coding Lab format offers unique opportunities of exchange and collaboration for digital media artists, who have an interest in translating aspects of choreography and dance into digital form and applying choreographic thinking to their own practice (What are choreographic coding labs? http://choreographiccoding.org/).

3 VIRTUAL REALITY

In this chapter, I will talk about Virtual Reality (VR). I will explain what Virtual Reality is, what do we mean when we talk about immersion and why did I choose VR for my study and how can it be used for creating art pieces. I will present my experience at Virtual Reality Programme of Loikka Dance Film Festival (Helsinki 2018) for readers to better understand the practical uses of Virtual Reality in a creative process. I will also briefly talk about equipment needed for creating and experiencing productions created in with Virtual Reality technologies.

3.1 First experience with Virtual Reality

My first experience with Virtual Reality was in 2017 when I did Erasmus exchange Programme in Rome (Accademia Nazionale Di Danza) and was exploring the beauty of the city. I felt disappointed about not being able to experience Rome in shape it was many centuries ago. For example, at present Foro Romano exists as ruins and we can only imagine how it looked like before, by seeing pictures of reconstruction. I was very excited to discover that the Museo dell Ara Pacis (Altar of Augustan Peace) offered an installation called "*The Ara as it was*" (it. L'Ara com'era). According to The Ara As It Was, the installation provides an Augmented Reality trip where the audience can experience the times the altar was built in and see it in full colors and details. I was not sure, how is it possible and what was an Augmented Reality, but I was hooked by the description and the poster of the installation.

Image 39. On-line brochure of *Ara Pacis as it was* installation. Screenshot by author (L'ARA COM'ERA).

> A multi-media tale in which history and technology come together to create a fully immersive and multi-sensorial experience of the Ara Pacis. People, gestures, and animals are turned into 3D animations that, with the addition of color, tell the story of the origins of Rome and the Emperor Augustus' family.
> …the Ara com'era, (The Ara as it was), the first systematic presentation of the use of augmented and virtual reality to enhance the value of one of the most important masterpieces of Roman art…. locals and tourists can now enjoy the opportunity to experience innovative storytelling about the Ara Pacis and the origins of Rome further enhanced by two new interesting features in Virtual Reality which, by combining live film, 3D reconstructions and computer graphics, make it possible to fully emerge one-self in the northern part of the ancient Campo Marzio and take in the first reconstruction, in virtual reality, of a Roman sacrifice. (The Ara As It Was. www.arapacis.it/en.)

It was a fantastic experience to be immersed to an entirely another world of Ancient Rome, being in the middle of the Campus Martius at the opening of the altar surrounded by members of the Senate and other aristocrats arriving and seeing the Ara Pacis Altar walls and details of decor as it was in its original design in 9 BC. Image 40 shows the difference between Altar in its present condition and Altar as it was in its original shape and color scheme (the one experienced on *L'Ara com'era* installation). The Ara As It Was uses word "magic" while describing the installation, which in my opinion is precisely the right word, as a result of being immersed into the world audience cannot experience in present time. For more visual details of the installation, I advise watching the promo video of the installation below: https://www.youtube.com/watch?v=CdsrMBtJgAQ

Ara Pacis: what, why.

The reasons of realization of the Ara Pacis is not limited to the altar; it is the result of a relationship between the message expressed, the age when it has been built, the place, the propaganda. **Symbolic meanings and real scenes, historical and mythical figures, all this give life to a story**. For us this story is hard to grasp. **"L'Ara com'era" (The Ara as it were)** is an help for the visitor, because it give a voice to the people connected to the monument; it also track down some of the **meanings** associated with images that are carved.

Image 40. Detail from an article about L'Ara com'era installation. Screenshot by author (RomeSweetRome 2017).

After experiencing the Virtual Reality for the first time I imagined how amazing that would be to create the similar experience for Forum Romano and other attractions all over the world, but mostly I was inspired to create art pieces with VR technologies since it makes it possible to experience anything, anywhere, anytime.

3.2 Artificial Reality

> "Virtual Reality is an artificial computer-generated world that can be experienced and interacted with "(TEDx Talks a, Phil Kauffold 2016).

In this chapter, I will explore different aspects of artificial realities: mixed, augmented and virtual.

3.2.1 Mixed, Augmented and Virtual Realities

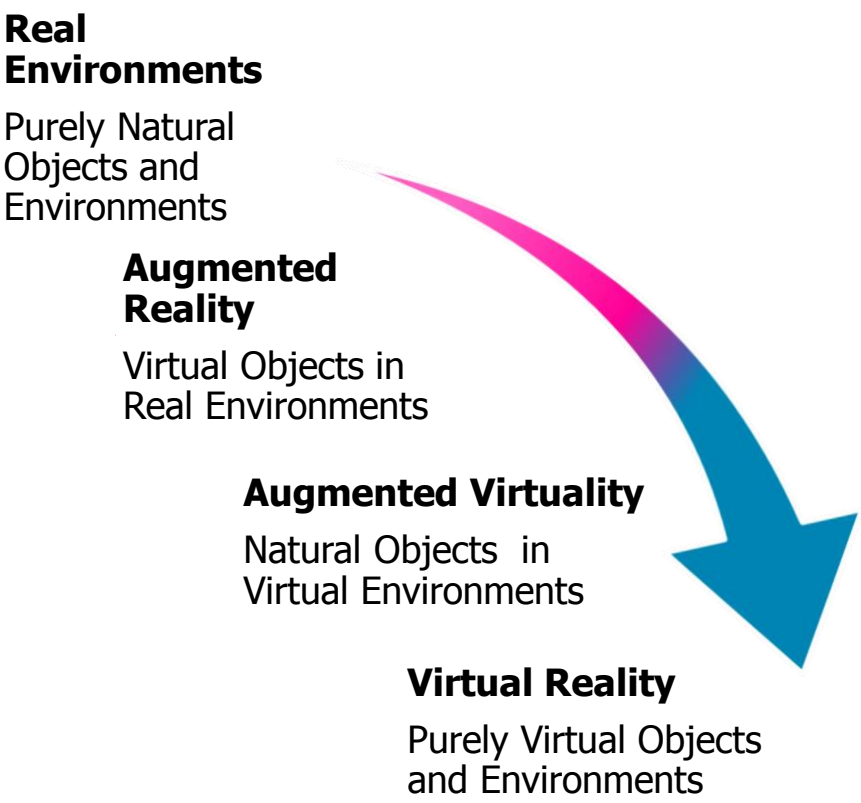


FIGURE 1. Virtuality continuum based on Paul Milgram concept (Wikipedia 2018b) and Reality Technologies a.

When we talk about digital realities, we can refer to a Virtual, Augmented and Mixed Realities.

An Augment Reality (AR), or a supplemented virtuality, as Reality Technologies a describes it, refers to the augmentation of a live direct or indirect view of a physical real-world environment, and computer-generated images are superimposed on a user's view of the real world, thus enhancing one's current perception of reality. In simple words: the viewer is not entirely immersed into an artificial world. He/she sees the world as it is, just with another digital layer. For example, as in

some parts of Ara Com'era installation audience perceive the Altar in its present shape, but some details of decor are animated or presented in color. Other examples of Augmented Reality are some mobile phone apps we can use on daily bases: games, beauty applications, created for trying new hairstyles or makeup, some GPS application made with AR (Pokémon Go), Disney Coloring Book app, Ikea Place app, etc.

> Unlike virtual reality, which requires you to inhabit an entirely virtual environment, augmented reality uses your existing natural environment and simply overlays virtual information on top of it. As both virtual and real worlds harmoniously coexist, users of augmented reality experience a new and improved natural world where virtual information is used as a tool to provide assistance in everyday activities. (Reality Technologies b)

Next level of a virtuality continuum is a Mixed Reality (MR).

> "With its limited virtualness, it is as well blending of virtual elements and the real world. In this case, MR combines the best of both virtual reality and augmented reality, where real-world objects are dynamically integrated into virtual worlds to produce new environments and visualizations where physical and digital objects co-exist in real time". (Reality Technologies c).

According to Reality Technologies (a), next level in artificial realities and, in most cases, a complete immersion providing reality is a Virtual Reality (VR) or an entirely virtual environment. A realistic three-dimensional image or artificial environment that is created with a mixture of interactive hardware and software and presented to the user in such a way that any doubts are suspended, and it is accepted as a real environment in which it is interacted with in a seemingly real or physical way (Reality Technologies d).

3.2.2 Immersion and interactivity

What is immersion and how can viewers interact with a virtual world?

As Reality Technologies d explains, a total immersion means that the sensory experience feels so real, that we forget it is a virtual-artificial environment and begin to interact with it as we would naturally in the real world. As I learned during exploration of Virtual Reality, the digital world can mimic the real environment, for example, the viewer can be relocated in a rainforest or a beach, or in contrary, provides the user an abstract or unfamiliar world, like an Open Space. In the first case, the viewer feels comfortable both physically and mentally, since the world he/she experiences is the same as the one we live in and in the second situation the viewer might feel dizzy or feel odd since experience is entirely new and unfamiliar for our body and consciousness. Both versions are altogether normal and may vary with the purpose of a particular VR experience. I will talk more about the purposes and uses of Virtual Reality in the chapter 3.2.4.

Another key element of a VR experience is interaction. According to Reality Technologies d, the aspect of interaction is crucial for virtual reality experiences to provide users with enough comfort to naturally engage with the virtual environment. By my experience, in some cases viewer can only experience a digital world as an observer, for example, while laying on the beach and see the world around him/her, but sometimes, for instance, in educational software, the viewer can as well interact with the environment and effect on it. In this case, the viewer can also see the virtual-self within the virtual environment. How this happens, I will describe in the next chapter.

3.2.3 Virtual Reality equipment

In this chapter, I will discuss the equipment used in a Virtual Reality. I will use information relevant for dancers or artists wishing to use VR systems in their creative process.

According to Reality Technologies d, there are three devices needed for creating and experiencing VR. The first device is a PC and software for generating the digital world: it can be a personal computer, console or a smartphone. Next device providing the experience is a Head- Mounted Display, usually called a Headset or Goggles. Headset contains a display, which covers the full field view and, depending on a device, headphones for audio stimulation. (Reality Technologies d.) As I learned at Loikka Festival this part can vary, depending on a VR gear we are using: some versions of headsets (HTS Vive, Oculus Rift) are connected to a PC with a wire and some, run on a smartphone (Sam-sung Gear VR) and connect to a PC with a Wi-Fi or a Bluetooth. This information may be an essential detail in case of creating an experience in which user may or should move in space. The user will be blocked from a real environment and will not be able to see the wire, which may provide a discomfort or even be dangerous.

Use of the third device also depends on a VR gear we use. An input device can be a motion tracker, trackpad or a hand-held joysticks and controllers, which are used for sending information about the user (location of the body or body parts in space and direction of the user is looking at) back to a PC to provide better interaction within a digital environment or in a transforming movement to a virtual reality for creating, for example, an environment with people or animals in it. (Reality Technologies d.) As I mentioned earlier, on practice this step very much depends on a system we use or an experience we create: some Headsets has a built-in motion tracker, and for some, we need special trackpads located in a room. Some VR experiences, in which user may or should navigate in and effect on the environment, controllers, data gloves or a motion tracking bodysuit should be used. In this case, the viewer's body also exists in a digital environment. Therefore he/she can see his/her body parts moving and feeling more present in another reality.

3.2.4 Uses of Virtual Reality technologies

As I mentioned earlier, many people use VR or AR on a daily bases - we play games, use GPS, beauty apps on our phones and create art. Here is the more detailed list of categories of uses and purposes of Virtual, Mixed and Augmented Reality.

Use of VR can be helpful in for example employee training or business marketing. According to Reality Technologies d, this could be more engaging and productive than a phone call or a conference, also because in this case, it is unaffected by physical distance. As I have noticed during the study, the most promising use of VR is, of course, the one with an educational purpose. Use of VR or AR in education is significant, in my opinion, because it can make the learning process faster and easier, due to more practical experience.

According to Reality Technologies e, the most common and accessible use of VR is entertainment. In this list we can put applications like games, theme park rides, augmented Reality TV, 3D cinema, Virtual Reality Concerts and many more.

According to Reality Technologies d, other uses of Virtual Reality in the list can be: sports, travel, navigation, therapy, manufactory, construction, design, military training and of course – art. Within this area, we can mention both - entertaining and training use within the art field. TilBrush created by Google is a room-scale painting virtual reality application (Wikipedia 2018c). According to Occupy White Walls, eponymous software is a "world of curation craft." "In this game user curates their own collection from hundreds of thousands of artworks, from the old masters to faeces on canvas "(Occupy White Walls).

According to 10 Amazing Virtual Museum Tours (2017), many museums made it possible to visit their exhibition in a virtual space: National Museum of Natural History (Washington), The Louvre (Paris), The British Museum (London), The Metropolitan Museum of Art (New York), etc. Shashank (2017) demonstrates that many artists create their art in or with the use of a virtual world: Elizabeth Edwards, Stuart Campbell, Gio Napkil, Rachel Rossin, Jon Rafman, etc.

3.3 Virtual Reality Programme at Loikka Dance Film Festival 2018

As I mentioned earlier, for this project, I have been looking for artists, schools, and courses, which specializes in New Technologies. In February 2018 I found information that Loikka Dance Film Festival is looking for a volunteer for a Virtual Reality Programme. Volunteer's tasks included running the VR Programme, which on practice meant - to familiarize with the pieces presented (this almost in every case included meeting the artists and VR experts) and learn how to operate VR equipment for manipulating the Programme.

Loikka Dance Film Festival Virtual Reality Programme took place in Helsinki 5-8.4.2018. VR Programme offered audience 13 different pieces presented in 8 different screening stations made with VR technologies. All of the pieces were linked to dance or movement, that's why I was thrilled to be part of the staff and have the opportunity to meet artists, discover more about VR technologies and

ideas behind the pieces presented. As I mentioned earlier, my primary goals of the study were experiencing the productions made with innovative technologies as an audience, understanding the range of possibilities from the point of view of a choreographer, learn more about the technical side of the pieces presented and build connections for possible collaborations in future. Loikka 2018 also organized a Mixed Reality day, which included the seminar with VR experts, VR Talks panel with artists whose works were presented on a festival, as well as workshops with Aoi Nakamura, Esteban Fourmi, and Renaud Wiser.

Image 41. Loikka 2018 VR Programme. Screenshot by author (Loikka goes Virtual Reality @Annantalo).

> The Programme consists of 13 virtual reality works offering an opportunity to explore the world of virtual dimensions and different ways of experiencing art. The Programme allows you to have an understanding of feasible recent virtual technologies but the curatorial focus has been on portraying the different means of dance, performance art, multimedia and music being present in virtual formats, producing engaging and fully immersive experiences. Virtual reality art is inherently multidisciplinary by its nature and in how movement, three-dimensional space, gravity and sensomotoric phenomenons become vividly experienced and immerse us into being deeply touched and evoked. Gaming, interaction, multiple dramaturgy and nonlinear narratives are customary tools in VR. These tools are also becoming popular in the common use of the performing arts. In the VR works presented at Loikka, these virtual means enable multiple dimensions to inhabit unknown territories and to blur the boundaries of the known and unknown worlds which enhances our consciousness of corporality. We are no longer just witnessing art in action but

> entering the world where the art takes place. We are touched, shaken, and sometimes overwhelmed by these unpredictable territories. (Loikka i.)

Pieces presented at Loikka is possible to divide into two groups. In this context, I will use words interactive and non-interactive ones. By interacting I will mean the possibility to move and effect to the environment within the virtual world.

3.3.1 Non-interactive pieces

By *non-interactive* piece, in this context, I call pieces, in which the audience is observing content and not changing or affecting on the narrative and virtual world of the piece. All the pieces were presented with Headset, headphones and a PC or a tablet, without the use of a hand-held joystick or controllers.

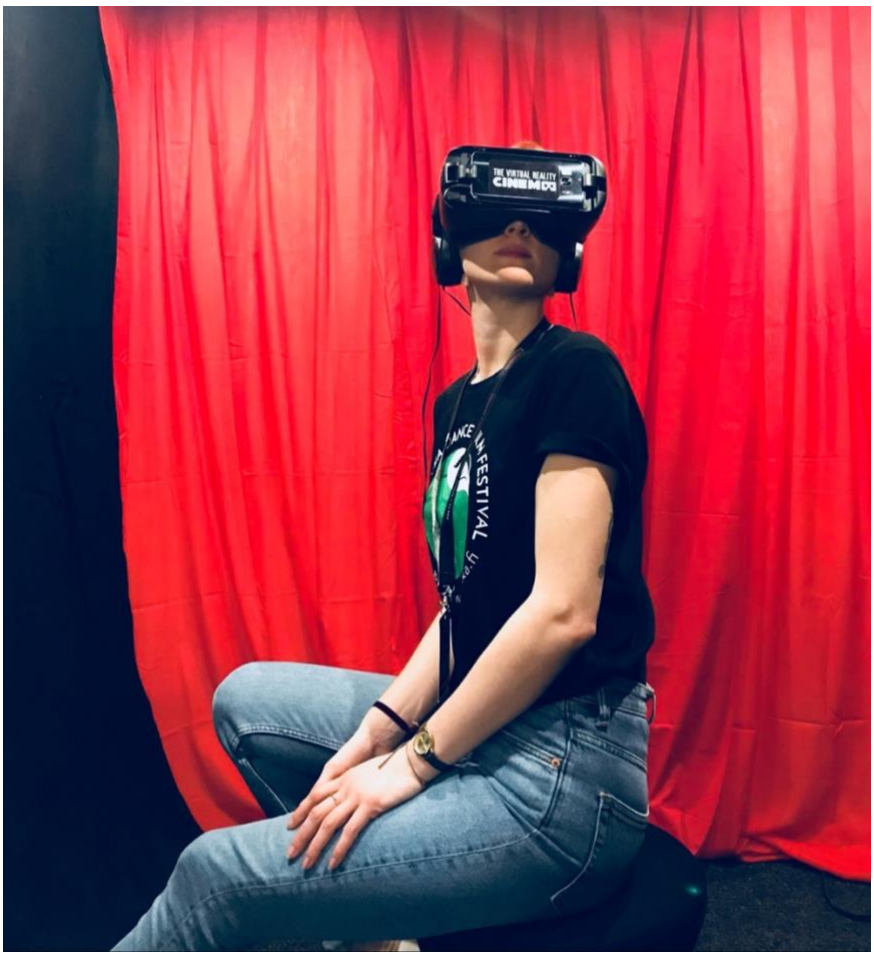


Image 42. The author is experiencing one of the *non-interactive* pieces at Loikka (Suominen 2018-4-9).

Performances 360° I and 360° II were made with 360-degrees video technologies and presented with Virtual Technology gears (HTC Vive and Samsung Gear VR). As Wikipedia (2018d) describes: 360-degrees videos, also known as immersive videos or spherical videos, are video recording where the view in every direction is recorded at the same time, shot using an omnidirectional camera or a collection of cameras. The viewer can watch the video like a panorama and has control on the viewing direction (Wikipedia 2018d).

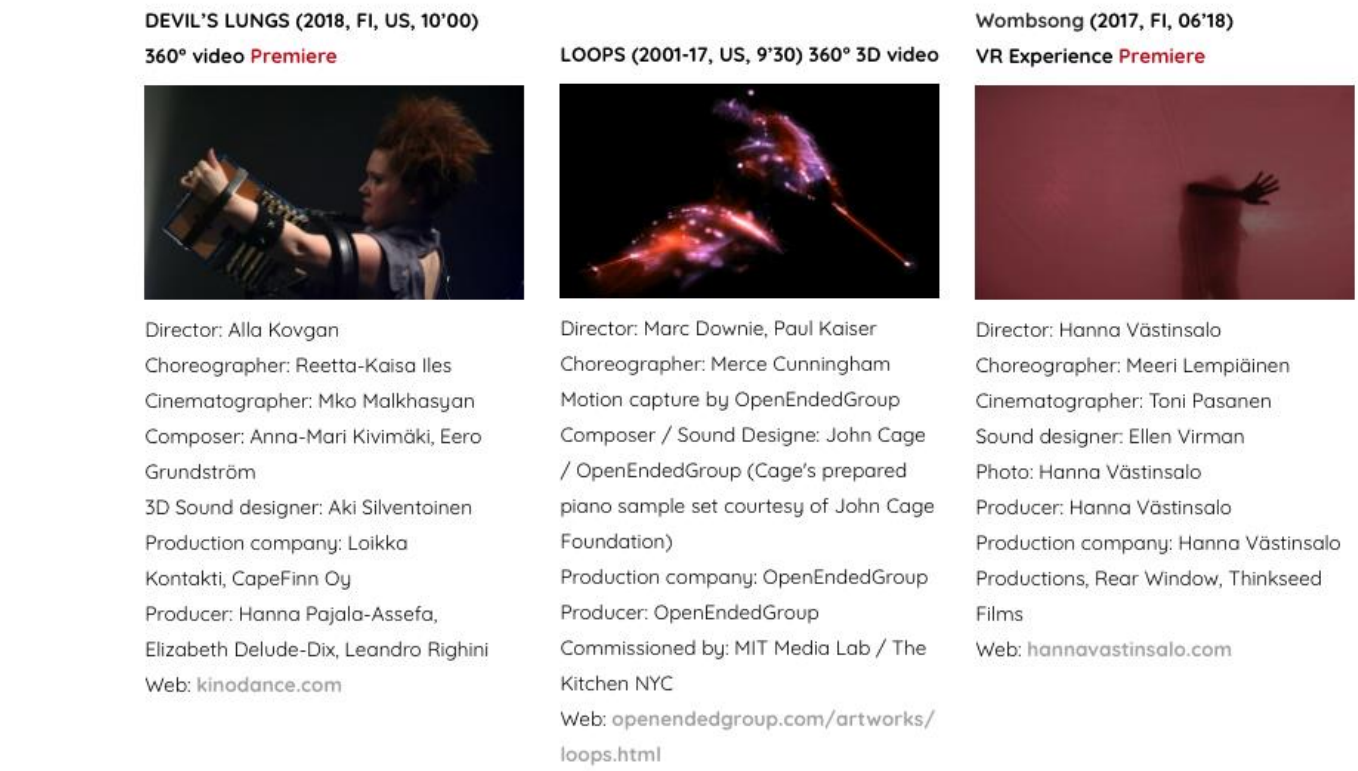


Image 43. *360 I*, Loikka 2018, VR Programme. Screenshot by author (Loikka a).

Both 360° I and 360° II performances consisted of 3 difference pieces.
360° I: *Devil's Lungs, Loops*, *Wombsong* (Image 43).
360° II: *Stuck in The Middle with You*, *Once Upon a Time in The Western Suburbs*, *King's Room (*Image 44).

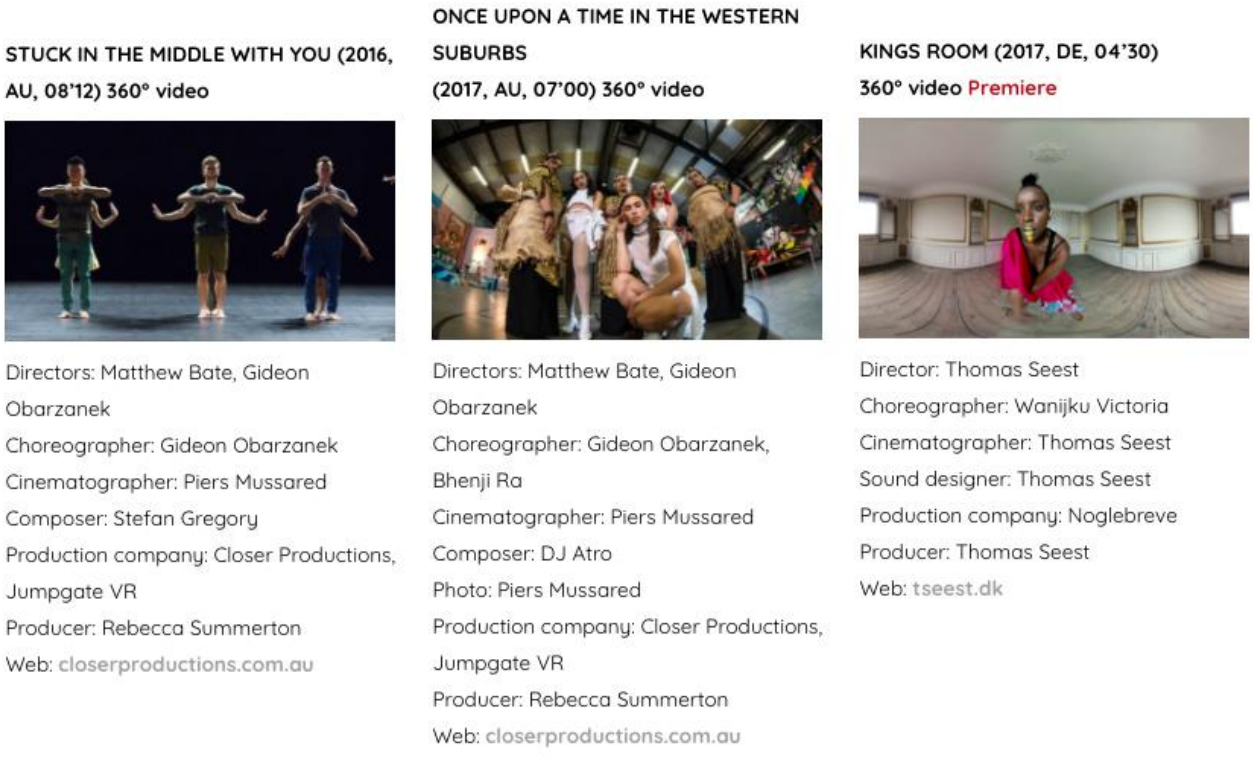


Image 44. *360 II*, Loikka 2018, VR Programme. Screenshot by author (Loikka b).

According to Wikipedia (2018d) films created with a 360- degrees technologies can be viewed with personal computers and mobile phones, but in my opinion, Virtual Reality added to this technology make the experience fully immersive and therefore unique. In case of pieces mentioned in this chapter, the viewer experiences very intimate performance presented only for him/her, because the viewer appears in the center of the environment in which the piece was shot, and, in most cases, the focus of performers is directed to the camera and during the viewing of the piece - to the viewer. In some cases, pieces were created in the way, that the viewer represents the main subject of the piece and therefore feels like a participant in a magical world of the experience.

In *Devils Lungs*, you are surrounded by spectacular performers and experience challenging boundaries between traditional and contemporary, male and female, hellish and heavenly, ecstatic and every day, celebrating the power of women through Finnish music and dance (Loikka a).

At the beginning of *Loops*, viewer dives into the abstract world with the dance of light. The piece is digitally recreated solo of Merce Cunningham accompanying with his voice and late John Cage piano. It is almost as if Merce Cunningham is standing next to you telling stories about his life years past before his role as the pioneer in the canon of contemporary dance. (Loikka a.)

Wombsong takes us to experience a beginning of a new life from a whole new perspective (Loikka a). It is no doubts very artistic and beautiful piece where the viewer feels warmth and love of the mother expecting a child.

Both Stuck in the middle with you and Once Upon a Time in the Western Suburbs pieces are very dynamic and strong, and both challenges viewer to dance: viewer appear in the middle of the stage with Sidney Dance Company or Western Sydney streets in the middle of a street dance battle.

Phantom: Smoke and Nunanc3d were made by Finnish startup company Delicode Oy with volumetric capturing and virtual technologies. Tuomisto (2018) explained, that volumetric capturing in the form presented in both pieces, means capturing a preset space in three dimensions by using three off-the-shelf Kinect for Xbox One devices attached to PCs running custom software.

NUANC3D, VOLUMETRICALLY CAPTURED VR CIRCUS PERFORMANCE (2017, FI, 05'00 – 15'00) VR Experience

Director: Julius Tuomisto

Choreographer: Jenni Lehtinen, Natasha Lommi, Hanna Moisala

Volumetric capturing: Delicode Ltd

Sound designer: Tommi Toivonen

Production company: Agit-Cirk, Delicode Ltd

Producer Jenni Lehtinen

Web: agitcirk.com, www.delicode.com

PHANTOM: "SMOKE" (2018, FI, 04'05) VR Experience

Director: Julius Tuomisto, Janne Karhu

Choreographer: Satu Tuomisto

Music: Phantom / Tommi Toivonen, Hanna Toivonen

Production company: Delicode Ltd

Production: Julius Tuomisto

Web: delicode.com

Image 45 and 46. *Nuanc3d* and *Phantom: Smoke*, Loikka 2018, VR Programme. Screenshots by author (Loikka c).

In both pieces, the viewer is not affecting the environment but shares the space with surreal characters among which he/she may move freely and observe the performance from different perspectives (Loikka c). Both pieces are combinations of visual art, music, dance, and circus immersing the viewer into a unique world. You can see the teaser video of piece *Nuanc3d* from the link below:
https://vimeo.com/152967687

3.3.2 Interactive pieces

In this chapter I will talk about *interactive* the pieces presented at Loikka 2018 VR Programme, which gave the viewer the possibility to change the narrative or the environment of the piece. In most of the pieces shown, the viewer experiences it with the help of a Headset, PC or tablet and input devices capturing the movement of the viewer (controllers, rigid body equipment for feet and hands presented on Image 47).

Image 47. Author experiencing piece VR_I at Loikka Dance Film Festival 2018. (Jobin 2018-5-3a)

"*Ocean Vortex* is a virtual reality experience, in which the participant will be transported into an interactive journey through changing, digital landscapes. It is designed to play with the relationship to the actual space, destroying it and changing it into something completely different". (Kalle Rasinkangas.)

Image 48. Ocean Vortex, Loikka 2018, VR Programme. Screenshot by author (Loikka d).

Ocean Vortex is a fully immersive experience, and before its start, the viewer gets a Headset with headphones and controllers, which create hands in a virtual environment. The adventure takes place in a room in which you are allowed and advised to move, due to the goal of the experience is to explore the environment and space you are in. The piece is not straightly linked to dance, but the movement and exploration are the keywords in Ocean Vortex experience. As a viewer who experienced the piece as well as a person who was running the piece and had contact with an audience, I must say, it definitely keeps viewers curious, excited and makes them move around the space and explore it.

By the link below you can see an example of an author experiencing the Ocean Vortex. The screen of the computer shows what the viewer is seeing, movement of objects in the space, which the viewer is making with the use of virtual hands (controllers) and excitement from experience of going through the solid object (statue) in a virtual world: https://youtu.be/bFFFhUFkHLU

"Inspired by the Work of Sigmund Freud, WHIST invites you on a journey into the unconscious mind, through the dreams, fears, and desires of a fictional family "(Whist).

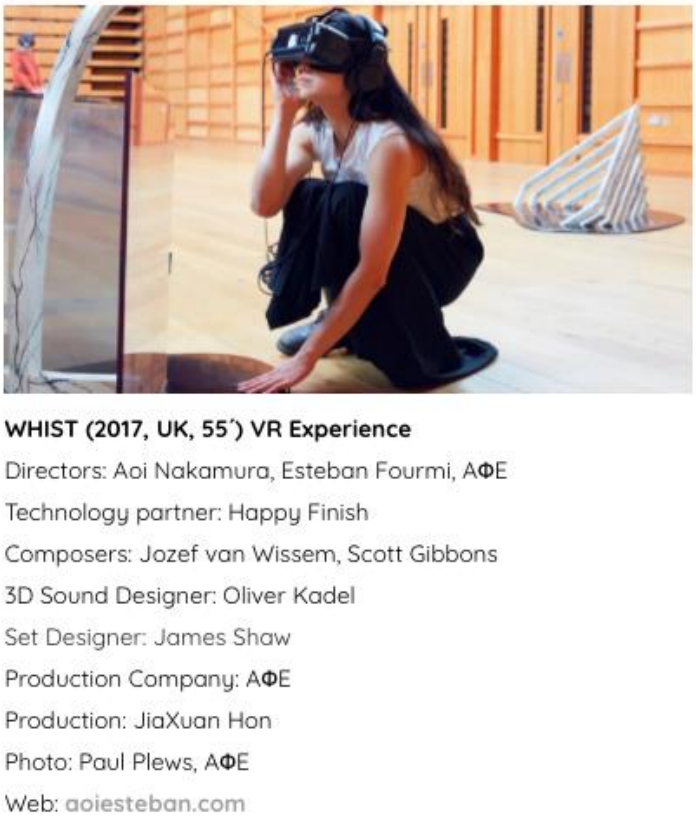


Image 49. *WHIST*, Loikka 2018, VR Programme. Screenshot by author (Loikka e).

WHIST, in my opinion, is an excellent example of merging different art forms with technologies. First things the viewer sees when he/she enters the room are beautiful sculptures, which later appear to be a part of the piece. Physical theatre and installation along with the beautiful and strong narrative are merged with Augmented and Virtual realities into an outstanding surreal piece, in which the viewer gets very personal experience: the narrative changes depending on each viewers

choices and instincts. There are 76 different variations of the narrative, and at the end of the experience each viewer gets a personal number (Image 51), which he/she can use for accessing the analysis on the website created for the piece. By the link below you can find a trailer video of *Whist*: https://www.youtube.com/watch?v=ier0cPF3cjg

Image 50. *WHIST*, Photography by Paul Plews.

To me as an audience member, it is hard to describe in words the feelings I got during and after experiencing the *WHIST*. It was for sure one of the most beautiful, intense, immersive and unique art piece I have ever seen and for me, as an artist, the experience showed a great example of how an art piece with such a profound idea can be created with the use of new technologies.

Image 51. Card with personal number after *WHIST* experience. Loikka 2018, VR Programme. (Susi 2018-4-9).

VR_I directed and choreographed by Gilles Jobin is another excellent example of how dance and movement can be transformed into a Virtual Reality for creating a unique experience for an audience.

VR_I (2017, CH, 15'00) VR Experience
Ohjaaja: Gilles Jobin, Artanim
Koreografi: Gilles Jobin
Äänisuunnittelija: Carla Scaletti
Valokuvaaja: Cie Gilles Jobin
Tuotantoyhtiö: Cie Gilles Jobin, Arsenic
Tuottaja: Gilles Jobin
Web: vr-i.space

Image 52. VR_I, Loikka 2018, VR Programme. Screenshot by author (Loikka f).

The real-time installation "VR_I" is a collective contemporary dance experience created by the Swiss artistic director and choreographer Gilles Jobin along with

> Sylvain Chaqué and Caecilia Charbonnier from Artanim, an organization specialized in motion capture. By mapping the body of the users through infrared cameras that follow the trackers located on their feet, hands and a computer backpack, each of them gets to personify the avatar of one of the five real dancers that were created by a careful 3D rendering scan and motion capture systems. (Buschmann 2018).

VR_I is made for a group of five people experiencing it. Each viewer gets wearable wireless equipment which enables him/her to experience the piece, and motion capture gear which enables the crew to create the avatar for the for every viewer in a virtual world. As avatars, the viewers may interact and communicate physically with each other as well as with a troupe of virtual dancers encountered in various settings (Loikka f). During the fifteen minutes, experience audience has a chance to go through an exciting narrative, appear in four beautiful spaces and even experience themselves in different sizes. During the experience created by Cie Gilles Jobin and Artanim foundation, the audience is surrounded by virtual dancers, which according to Cahn (2018) were created with motion capture technologies. Viewers invited to dance with them and other avatars, who represents other viewers in a virtual environment. This particular feature is possible due to the use of a real-time motion capture technology Vicon (Cahn 2018). By the link below reader can find a video about the piece and have a better picture of what the viewer is experiencing: https://www.youtube.com/watch?time_continue=1&v=ccWWFsOtH3Q

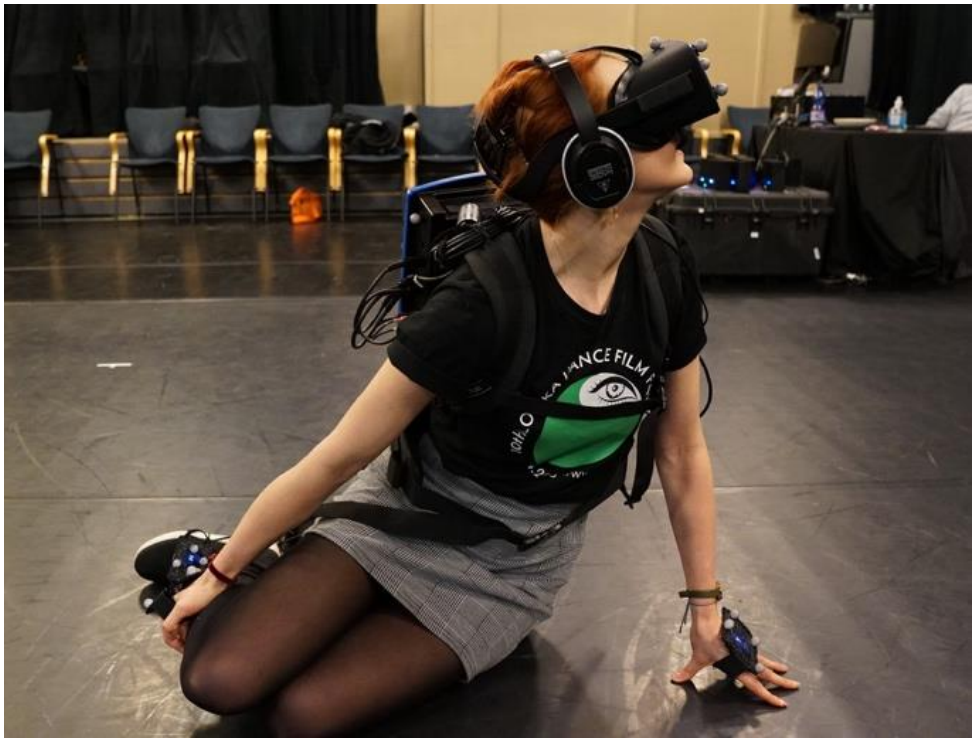


Image 53. Author experiencing VR_I, Loikka 2018 VR Programme (Jobin 2018-5-3).

3.4 Other examples of art pieces merging Dance and Artificial Realities

There are many more productions, which merge dance and Virtual Technologies. Few of them were presented at Loikka: *Through you* (Image 54), created with 360-degrees video technologies and

EgoCure (Image 55), which mixes a new technical approach of stereoscopic 360 videos, CGI animation, and interaction between the viewer and the art piece (Loikka g & h). Both pieces are directly linked to dance as being a tool for storytelling, as in *Through You* or being an essential part of the narrative, as in *EgoCure*.

THROUGH YOU (2017, US, 14'00) VR Experience
Directors: Lily Baldwin, Saschka Unseld
Choreographer: Lily Baldwin
Cinematographer: Dagmar Weaver-Madsen
Composer: Mark Degli Antoni
Sound Designer: Drazen Bosnjak
Production Company: Fictionless
Producers: Shruti Ganguly, Elliot Whitton
Web: lilybaldwin.com/details/86/director-film

Image 54. Through You, Loikka 2018, VR Programme. Screenshot by author (Loikka g).

EGOCURE (2017, FI, 20'00)
Director: Synes Elischka
Choreographers: Janina Rajakangas, Kaisa Kukkonen
Cinematographer: Theofanis Kavvadas
Sound designer: Jorma Kaulanen
3D Sound Designer: Unreal Engine Can Uzer
Production company: ELO Film School Helsinki / Aalto University
Producer: Mikko Asikainen, Pia Tikka
Website: virtualcinema.aalto.fi/project/ego-cure-vr-film/

Banner photo: EgoCure (2017, FI) / Director: Synes Elischka /

Image 55. EgoCure, Loikka 2018, VR Programme. Screenshot by author (Loikka h).

Another example of a merge between dance and Virtual Reality is *Night Fall* by the Dutch National Ballet, which is the first Virtual Reality ballet in the world. The ballet is created with 360-degrees video technologies and can be viewed on a PC, smartphone or for a fully immersive experience with the use of a VR Headset. (Nightfall.)

The 360-degrees film created in collaboration between Barneys New York and Martha Graham Dance Company is a mix of technology, dance and fashion (Jackson, 2018) (Image 56).

Image 56. Scene from 360-degrees film created by Barneys New York and Martha Graham Dance Company. Screenshot by author (Jackson 2018).

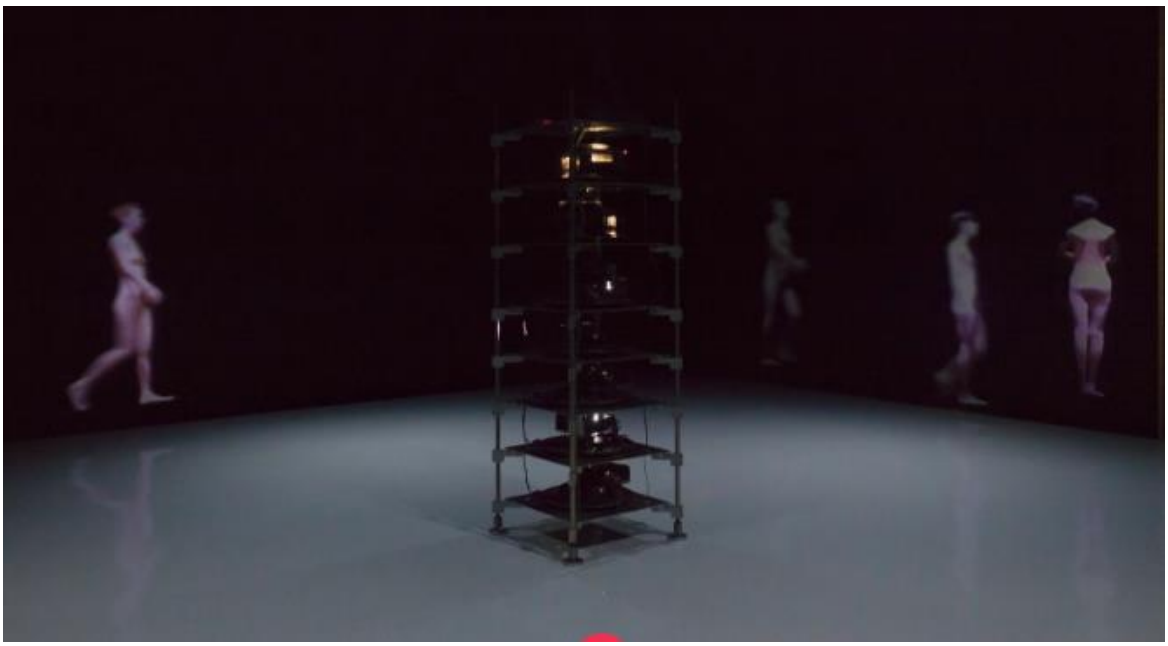


Image 57. *Lovers* by Teiji Futurashi. Screenshot by author (Teiji Futurashi: Lovers).

Presented in The Museum of Modern Art (New York) room-sized installation *Lovers* is a piece made by Japanese artist Teiji Fuhurashi. The figures move like specters around the perimeter of the space, in a looped choreographic sequence made variable by a visitor-activated motion sensor, which intervenes to restart one of the projections when triggered (Teiji Futurashi: Lovers).

Alexander Whitley, inspired by stunning images and data produced by solar science research, creates the *8 Minutes* dance piece in collaboration with scientists from Science and Technology Facilities Council Rutherford Appleton Laboratory (STFC RAL) and visual artists (8 Minutes). According to *Celestial Motion*, he uses stunning video projections on the stage and later, he creates an eponymous VR version with the Guardian Virtual Reality department.

Image 57. Celestial Motion. Screenshot by author (Alexander Whitley).

Dust, created by the group of independent artists based in Prague (chor. Patricia Okenwa), is a virtual reality piece which invites the audience to experience dance performance from the perspective of the eternal particle traveling in space. Dance movements are captured with the use of volumetric recording technology. (What is Dust).

About *Camouflage* I have heard from a creative producer of the piece Renaud Wiser (Wiser 2018). According to Camouflage, eponymous mixed reality game is a playful interactive installation inspired by an old game known to many ancient cultures. During the experience, the audience members can only see an abstract representation of their surroundings and simulated bodies in motion but have an identity which one of the abstracts objects actually belong to a real person. Same time players outside on the virtual reality, who have sensors attached to their bodies, have to stay unnoticed for as long as possible. (Camouflage.) Wiser (2018a) also brought out the research during the creative process and different experiments with movement and sound. For example, in one experiment they used lines drawn by controllers in a virtual reality, which the viewer had to follow and by doing this he/ she would follow the choreography of previous person (Wiser 2018a).

Another experiment included particular areas in a virtual environment, by exploring and touching which, the viewer would create a music score. It was fascinating to hear about the research during creating the *Camouflage* because the goal of this piece is to make audience playful, interact with other participants and the virtual environment by movement. The email conversation with Wiser strengthened the understanding that some of the experiments will not be part of the final work. *Camouflage* will be fully completed in June 2018 (Wiser 2018b).

3.5 Thoughts about Virtual Reality

We have to acknowledge that Virtual Reality Technology and its popularity have negative sides, but this statement can also be referred to any new developing technology. Elischka (2018) in his lecture about VR at Loikka Festival mentioned that it is isolating especially young people from reality and offering only diversion, not information. Indeed, Virtual Reality travel or Virtual Museum applications cannot replace real experience, but Virtual Reality can answer the question of how could it be? In our conversation with Kalle Rasinkangas (2018), we have concluded, that artists have a responsibility to keep Virtual Reality commercial and artistic values in balance, by creating art productions with VR. By doing this, we can keep the audience interested in art and not allow Virtual Reality to absorb the younger generation by occupying it with VR computer games and holding it away from real life experiences.

In the context of educational purposes, Virtual Reality proves its benefits. Abbott (2014) finds that, for many children and young people, particularly those with learning difficulties, attending a theatre performance can be a confusing and stressful experience. I, therefore, can surely claim that VR can help many people with this problem by providing art performance experience avoiding stressful

situations. This particular technology could also solve the main issues I concerned about for many years - the accessibility of the art as well as the expansion of its dimensions. As Zenka (TEDx Talk, 2016b) points out, with Virtual Reality very expensive experiences become very inexpensive, replicable and sharable. As I learned, a piece created with Virtual Reality technologies could be seen anywhere geographically as well as independently from the time it was made or, in this case, performed or released. As I witnessed at Loikka Festival, Virtual Reality allows people with disabilities to experience what it is to dance on the stage with other dancers. As a result, we can say that Virtual Reality increases accessibility and aspect or participation in dance or other art productions.

Increasing the interaction with the audience and putting them into the piece and having their effect on it can be easily achieved with Virtual Reality. As New Movement Collective points out, placing the two (performer and spectator) alongside each other in the same arena, we invite a close encounter with dance, stimulating the senses and activating the imagination. "This powerfully immediate experience of movement, sound, and other media encourages curiosity and compels action, and in doing so, expands the possibilities of where choreography is manifested" (New Movement Collective).
Even though nowadays we use the description "computer – generated" world when we speak about Virtual Reality, I totally agree with Fabien, who says that "the theatre and scenic arts are essential fields of research for creation in VR, namely for their constant concern about constructing spaces, illusions, stage settings and the dynamics that bring spectators, actors, and creators together". Artaud (1938) identify theater with alchemy and explains, that alchemical books should be understood as the expression of an identity existing between the world in which the characters, objects, images, and in a general way all that constitutes the virtual reality of the world in which symbols of alchemy are involved. In simple words, artists and choreographers create a parallel reality in their works. Therefore it is already a Virtual Reality. This is why computer-generated Virtual Reality expands the dimensions of art and gives the possibility for the audience to be completely immersed into the world which artist create.

As I have learned during my study, Virtual Reality gives a possibility to have new experiences and feel the energy of performers or objects presented in the piece with its immersive aspect. I can also say, that VR breaks the limits of perceiving new experiences by allowing us to immerse into something entirely new and sometimes even impossible in real life. As an example, in *Dust*, the viewer experiences what is to be a little particle of dust which floats around the space and see the world from a new perspective. In videos made with the GoPro camera and viewed with Virtual Reality headset, we can experience what is to fly high above mountains like an eagle. As Zenka points out your brain and subconscious process the information and body cannot tell that's it is not real. With Virtual Reality, we can experience and learn new things, which can not always be achieved in the real world.

In the context of preservation and documentation, I think, Virtual Reality is one of the best tools for creating art pieces without fear of losing their original form. The aspect of energy and artistic

expression has been already analyzed throughout the process of creating the piece within the virtualworld. VR Technology as well brings the possibility to give a new life for old art pieces by transforming them into Virtual Reality and also allow us to deeper immersion into pieces we have only seen on TV or in a big theatre auditorium while sitting far away from the stage.

4 CONCLUSION

The primary goal at the beginning of this study was the practical approach to new technologies in the dance field. I wanted to find collaborations or professionals, with whom we could try to merge some of the technologies with movement on practice. It could be, for instance, a short workshop or laboratory time in the studio or full performance or piece created and presented for example in Kuopio. Unfortunately, as I mentioned earlier, it was not a very easy task to find collaborations, due to lack of professionals in the new technology area in Finland and timetables, especially with professionals abroad. I was pleased to continue my exploration with the more theoretical approach because I had the chance for a more close look at Virtual Reality Technologies at Loikka Dance Film Festival. I can say that I did achieve my goal to evaluate if technologies can provide tools for artists and if they can extend the accessibility of art.

During my study, I discovered many inspiring artists and productions, where art and new technologies merge in new art forms. I learned that new technologies do give artists new dimensions for expression and allow them to experiment and explore new ways of creating and presenting their art. In some examples technologies even made impossible experiences possible.

It seems that the last few years showed rapid rise of productions merging technologies and art or science and art. Even during this study, I did explore more and more exciting creations which I did not know about at the beginning. I think it proves that technologies work in the context of art and increase the interest of the audience, which could be the result of the mentioned media revolution, but also participation and accessibility of art. I think the audience is more opened and interested in trying to create art themselves and be part of the productions.

In the written part of this study, I wanted to collect information about technologies involved in art, artists and productions created with these technologies. I hope these examples could be helpful and inspire artists, who are not familiar with the possibilities of technologies, to experiment. I hope this paper can help those who may have same problems as me when I could not achieve a rich and full result of some of my artistic ideas and was not familiar with such options I described in this study.

I would like to mention inspiring words of Synes Elischka's presentation on Virtual Reality at Loikka Dance Film Festival (Elischka 2018): always test everything, seek collaborations instead and learn from other art forms. I hope this paper can help bring together professionals from different areas to work together and produce fascinating artistic experiments. I am willing to continue looking for collaborations and am thinking of extending my studies later on Choreography (Master's Degree) where I could get more practical experience or study technology area to have the skills for producing my own media art creations.

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https://www.loikka.fi/home.html

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Loikka >VR Programme>VR_I
https://www.loikka.fi/home.html

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