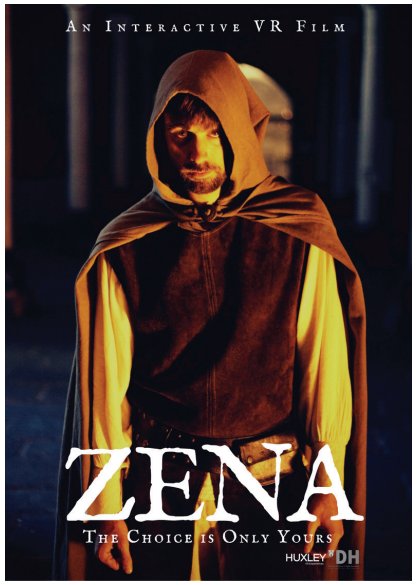
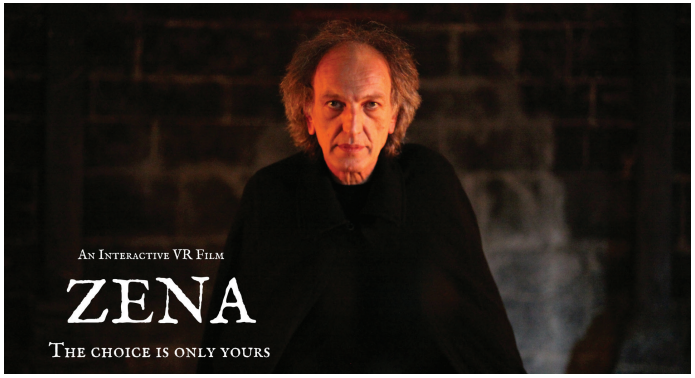
7 ZENA — AN INTERACTIVE VR FILM

Maria Cecilia Reyes, Serena Zampolli





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Interactive VR film, 2017
https://www.xehreyes.net/zena
Samsung Gear

Zena—which means “Genoa” in genovese dialect—is the first immersive and interactive film set in Genoa. The story unfolds in a 360º environment created through Live Action. In ZENA the user plays an active role inside the narrative by interacting directly with the story: she/he decides which way to go, if she/he wants to follow or ignore the advice of a character, or access extra information that contributes in the understanding of the story.

Its narrative structure is inspired by the labyrinth of alleyways in the historic center of Genoa (World Heritage Site), where walkers come face to face with choices that lead them to interact with different environments and people. In “ZENA”, users will help Lorenzo during his travel to the future, yet the responsibility to choose the right path will not fall on Lorenzo's shoulders, but on yours.

Time and Tempo are two important factors inside “ZENA”: The plot of the story is a travel in time, and protecting Time is the reason the main character embarks in this journey. The story starts in the XIV century in Zena, where we meet Lorenzo: a young apprentice of Alchemy and a member of the ancient Order of Saturn Knights. To save the magic clepsydra that belongs to his congregation, he will have to travel 500 years in the future, to the modern Zena. To save the clepsydra, he will have to pay special attention to details, because in Zena, things are not always what they seem. Lorenzo storyline is decided by the user, and the travel in time becomes also a travel in tempo. Interactive Storytelling works as a system of parallel universes: all the possibilities are contained in a suspended tempo, that becomes a real sequence of events as a consequence of human choices. In the game of sliding doors which is life, it is not possible to live all the possibilities the world has to offer, but in “ZENA” yes, it is possible. The user can experience the story a first time, engage with one storyline, and then, when the story ends, can decide to start again and follow a different path.

SHOOTING AN INTERACTIVE VIRTUAL REALITY FILM: ZENA'S PRODUCTION CASE STUDY

Maria Cecilia Reyes, Serena Zampolli

Introduction

ZENA is an immersive and interactive film set in Genoa, Italy. The story unfolds in a 360º environment created through 360° high-definition video capture developed to create virtual reality experiences such as Cinematic VR (cVR). In ZENA, the user plays an active role inside the narrative by taking part directly in the story: s/he decides which way to go in a Maze type structure (Ryan, 2015), if s/he wants to follow or ignore the advice of some character, or access extra information that contributes to story understanding. The narrative structure has been inspired by the labyrinth of alleys in the historic center of Genoa, where passersby come face to face with choices that lead them to interact with different environments and people. ZENA, which means Genoa in genovese dialect, was recorded inside the historical center of Genoa (Old Town), which is a World Heritage Site. The scenes, that develop in the alleys and in some important palaces in the Old Town, show these environments for the first time in VR.

The main objective of ZENA is to bring together an interactive film narrative inside a 360º environment to be enjoyed with a Head Mounted Display (HMD), in order to create an interactive and immersive cinematic experience: an Interactive VR experience similar to hyperfiction, in which the user rearranges a choice of story fragments into different configurations (Ryan, 2009), placing him/herself between a passive reception, as it is the case with cinema, and a highly active role, as in videogames. In this paper, the shooting process of ZENA is reported, highlighting the main challenges we faced and hindsight gained. For the production of ZENA, we based our methodology on the traditional cinematography production workflow, being cinema the audiovisual art form closer to this type of experience, but adapting it to Interactive Narrative (IN) (Dettori, 2016) and the immersive nature of Cinematic VR.

Screenplay for an Interactive VR Film

In order to keep the narrative flow and the empathy of the user towards the story, ZENA is based on a screenwriting framework (Reyes, 2017) that combines the cinematographic classic structure (Field, 2005) with an interactivization (Koenitz, 2016) of the Hero's Journey (Campbell, 2008), so the dramatic tension of the experience is ensured and the climax of the experience is independent of people choices. The result of this process is a mind map (Figure 1) that shows the narrative structure of the cinematic interactive VR experience. The map is composed by Narrative Nodes (NN) that are linked with each other (External Links) or have multimedia contents (images, text, music, videos) enriching the narrative (Internal Links). Each narrative node can correspond to a single scene or to a sequence, i.e., a group of scenes that are edited together. The word scene is used in its cinematic sense, a fragment of the story that takes place in a specific location and time (Field, 2005); a change of location or time corresponds to a change of scene.

The NNs in ZENA correspond to different stages of the Hero's Journey, as a put-into-practice of one of the most frequently used narrative structures of classical cinematography (Mackey-Kallis, 2001; Vogler, 2007). ZENA's experience is articulated through 20 NNs that offer different navigation paths, whose interlacing is determined by user's choices.

The shortest route allows the user to cross ZENA in 10 minutes, while the longest road lasts 20 minutes.

Once the mind map is designed, with a logline that describes what occurs in each narrative node, the second stage consists in the writing of the literary screenplay, which includes the detailed description of what happens in the scene: the characters, their actions, their movements in space and their dialogs (Field, 2005). In traditional linear cinematic screenplays, a heading is assigned to each master scene to show: the scene number, if it is shot in interiors (INT) or exteriors (EXT), the main location in which the scene develops and if it occurs at day or night. Underneath, the body of the scene is included, together with the detailed visual description of the stage, the emotional state of the characters, their movements, and their words. At the end of each scene, the type of cut that connects the master scene with the next one is written on the right margin.

In ZENA's interactive screenwriting process, once each scene was fully written and carefully narratively connected with the other scenes, we had to adapt the screenplay so as it could work for both cVR and IN. In the cVR case, we took into consideration the need to think about the scene in a 360º space by inserting visual and auditory elements (characters, extras, props, or interactive elements) that enhance the experience in the whole visual space. From the IN point of view, the screenplay needs to take into consideration that one NN can be both destination and starting point of multiple nodes. The new script should be able to lead the production crew during the shooting.

The interactive screenplay establishes two main differences from the traditional cinematic screenplay. On the one hand, it needs to clearly specify the path that the story is following: the current NN, but also the possible previous and the next NNs. On the other hand, crew and actors need to know how interaction occurs inside the NN: the type of interaction (visual, auditory, internal or external) and when and where the user will be allowed to react. In Table 1, we are proposing the Master Scene Heading format that we use to shoot ZENA: it is composed by the number of the scene, a short description of it, the location, the number of shots that form the NN, which characters are participating, the precedent NN (Inputs), the sequent NNs (Outputs), a space for the description of the audio setting, and the types of interaction.

Due to the nature of 360º video, we felt the need to insert a new item that would help the cinematographer to know where to place the camera: The Narrator Type (NT). This item indicates who is the viewer inside the scene, following the framework proposed by Cleanth Brooks and Robert Penn Warren (1943), used also by Gerard Genette for drawing the concept of Focalization (1976) that describes the different types of narrator in literature.

In our adaptation (Table 2) the narrator is replaced by the user of the VR experience, allowing us to identify four types of user roles inside the storytelling. The role of the viewer inside the story defines how the camera will be placed into the stage, in accordance with the director's intentions. In ZENA, we used all types of NT, even though in most scenes we used type 2 and type 3, in order to test the visual flow by changing points of view.

The screenplay is completed by the body of the scene, which describes the actions of the characters, their dialogs, their physical and emotional states, as well as the physical space. It reports what can be seen or heard and also the movements of the characters inside the stage. At this point, the screenwriter must take into consideration the whole space in 360º when locating characters and props, so as to create a rich scene for the viewer to explore. The body of the interactive screenplay (Fig. 2) reports the interactive choices and how they are presented to the user, e.g. if they include text or only visual symbols. To write the body of the scene, we used the typing guidelines of traditional movie screenplays.

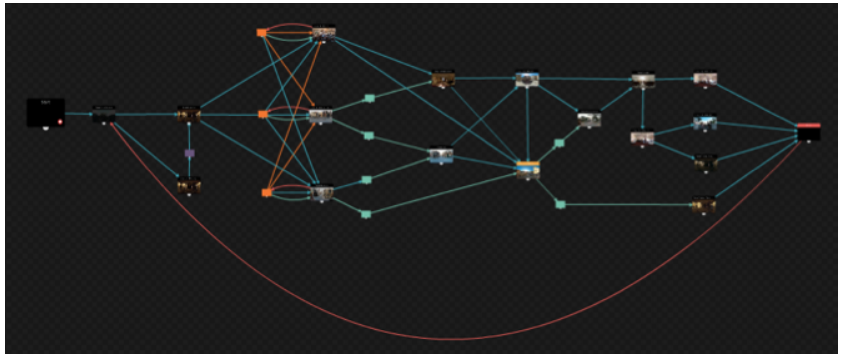

Figure 1 Mind map of Zena made with Wonda VR

NN	6	Description	Enemy
Location	Vico dell'amor perfetto	Narrator Type	3
Nº Shots	3	Characters	Lorenzo - Sercan
Inputs	3. New World	Outputs	7. Oracle 8. Wrong Approach
Audio	Dialogue – Binaural Mic	Interaction Type	n.2 Visual Hotspots n.1 Return Visual Hotspot

Table 1 Interactive Screenplay Heading used in ZENA

Shooting in 360º: The Scene is The Stage

For the creation of this interactive cVR experience, ZENA was shot in 360º video with two cameras with a field of view of 180º each, binaural microphones on the ears of Lorenzo -the main character- and a bidirectional microphone situated in the same axe of the camera for ambient audio and wild tracks. VR stories are usually short films with a average length of seven minutes, due to the visual fatigue and discomfort that some people can experience (Lin et al., 2002). ZENA was built with a longer duration in order to give the feeling of a film, and to test if experiences of a duration that exceeds the average 7 minutes can entertain without generating discomfort. Thereby, ZENA's length is longer than most of currently available VR short films and documentaries, being the longest path 20 minutes long. It means that each NN is on average one minute long. Some NN includes more than one scene, hence a single scene in ZENA has a length of one minute or less. In this section, we will describe how we conducted the shooting of ZENA, taking into consideration the 360º nature of the project and the interactive screenplay: the location of the camera according to the screenplay and the recording of the scene passing through the rehearsal on set.

The crew of ZENA had experience in theater and traditional video production. For most of actors and crew, however, ZENA was their first time with 360º videos. Even though our experience in both theater and cinema gave us the grounds to work on this production, we felt that some initial preparation was necessary to allow the team involved to get a first contact with the equipment and the workflow.

Shooting in 360º requires a different approach to space: everything is being recorded and therefore, every single angle will be seen by the user. There are no hidden spaces. The frameless image frees viewers' eyes and gives them autonomy to explore the space, but from an authorial point of view a common question that emerges is: how to lead viewer's attention to what the author wants them to see? We propose two ways of solving this issue: by the position of the camera and its distance from the key situation, and by the management of the stage (actors' movements, key elements, sounds and situations inside the 360º space).

The Camera: Director's Eye – Viewer's Eye

One of the main fears that traditional filmmakers and videomakers face when working with 360º is the disappearance of the frame (which is frequently related to a possible disappearance of the direction role), but the director's intentions in a 360º environment can have a greater reach on the viewer's experiential level. The sense of presence (Barfield, 1995; Murray, 1997) gives the creator the possibility of transmitting embodied perceptions of the world, that is the standing point from which the "real author" (Chatman, 1989) experiences the being. The camera is not only the eye of the viewer, but its location will also be the location of the viewer inside the scene. The director has to experience in first place the point from which s/he wants the viewer to experience the story.

The Narrator Type, seen in Table 2, offers a first indication about the position of the camera. The horizontal axis of the table indicates if the user belongs to the story or not. In NT 1 and 2, the location of the camera has the key role to personify the main character and the other characters will interact with the camera. Locating the camera as a "live" character has technical consequences: it requires a special rig to be placed on a person or object in a way to recreate the embodiment of the first person's point of view. In NT 3 and 4, the camera/viewer does not belong to the story, but its involvement in the story depends on how much infor-

	Internal Analysis of the Events	External Observation of the Events
User is a character of the story	1 - User lives her own story	2 - User and main character interact
User is not a character of the story	3 - User is analytical regarding the story, having access to characters' feelings and thoughts, or having information that is unknown to the characters.	4 - User observes the events without participating

Table 2 Types of users in VR storytelling. Adaptation from Brooks & Warren (1943)

Figure 3 Frames of the NN 4 "Internal Confusion" at the decision-making moment

NN	4	Description	Internal Confusion
Location	iazza Scuole Pie Church	Narrator Type	3
Nº Shots	1 Square 2 Inside Church	Characters	Lorenzo - Sercan
Inputs	3. New World	Outputs	7. Oracle 8. Wrong Approach
Audio	Dialogue	Interaction Type	Hotspot on characters

EXT/DAY – PIAZZA SCUOLE PIE
Lorenzo arrives in Scuole Pie Square. He looks around with hard breathing. In front of him there is the church.

CUT TO: **INT/DAY – CHURCH**
Lorenzo is seated in one of the pews of the church meditating in silence. An old lady is cleaning around. She notices him and talk to him with curiosity.

OLD LADY (talking to Lorenzo)
— Did you lose your way, young man?
While the woman talks to Lorenzo, a drunkard walks into the church and seat just behind Lorenzo.

OLD LADY
— Those like him have no salvation. But I can say from your eyes, that you have so many things to do, important things. Always seek the light. Always remember to walk towards the light.
The old lady walks away, continuing with her work.

DRUNKARD
— I know what your problem is. You just need some love. Go to the Holy Sepulcher street. Trust me. Do not listen to that woman.
The drunkard stands behind Lorenzo, looking at him while he makes a decision. The hotspots are located on the characters. Lorenzo has to choose one of them.

Outputs:
Drunkard: 7. Oracle
Old Lady: 9. Wrong Approach

Figure 2 Interactive Screenplay with heading and body

mation the viewer can get from it, if h/she is totally external to what is happening, or has some hints about the internal feelings of the characters, or gets information that the characters don't have. NT 3 and 4, unlike NT 1 and 2, in which the camera embodies a character, the screenplay takes the main role, deciding to give or not to give information that allows the viewer to be analytical about the story.

The position of the camera can have different implications as it happens with the type of shots in cinema and their semantic meanings. Here is where Director's intentions and point of view can be made clear. We have identified the following types of camera positions, as evidenced by the following frames of the film:

Viewer Protagonist NT1 (Figure 4): First Person Shot or Point of View (POV) Shot. The back camera is located directly over Lorenzo's right eye, so the front camera gets the feeling of being one of Lorenzo's eyes.

Height of the camera

Natural Eye line (Figure 5) For the natural eye line we chose a camera height of 1,65 m, in order to give a realistic feeling of someone with an average stature. This height worked very well in relationship with ZENA's actors' stature.

Below the Eye line – Low Angle Shot (Figure 6). During Scene 2 of NN 9 Lorenzo speaks directly to the camera, asking for help to the magic cane that he carries. The magic cane corresponds to NT 3, a companion to the protagonist, and it corresponds consequently to viewer eyes. The intention of this shot is to create an emotional bond between Lorenzo and the user, through eye contact. The height chosen is the natural height of the cane. In relation to Lorenzo, the position of the camera gives us what in cinema it is called a Low Angle Shot.

Above the Eye line – High Angle Shot (Figure 7). In Scene 1 of NN 10 Lorenzo lives a magical revelation that can help him, depending on user choices, to succeed in his mission. The scene was shot inside a medieval tower. Lorenzo listens to a voice that says to him to go to the top of the tower to live the revelation. He goes up but he is afraid. During this scene, we are using NT 3, that corresponds to the magic cane that Lorenzo carries in his right hand and always in front of him. In Figure 7, the image allows us to see that the camera/magical cane is located above the level of Lorenzo's head, creating a cinematic High Angle Shot in relation to his face and body. This shot makes Lorenzo look smaller, and therefore, in relation to the narrative, fragile and scared.

Distance of the Camera from Key Elements (Fig 8): The distance of the camera from the key actions, characters or elements of the scene can be compared to close up shot, medium shot, wide shot or panoramic shot. In Scene 1 of NN 7 Lorenzo encounters the oracle. Camera is in NT 3, and it is located in order to give the user the sensation to be seated with them in the table. In this case, we miscalculated the height of the camera and it is slightly above characters' heads, which gives a strange embodiment for the user.

During ZENA, we shot the scene "Death of Lorenzo", that was not included into the final project due to an error in continuity. The scene, however, allowed us to experiment with non-natural positions of the camera. The scene was shot from a 4th floor window, locating the front camera towards the ground, where the scene was developing, and the back camera towards the sky. The camera was hold by a man that was observing the scene from his window, making him a subject that belongs to the storyworld. The monopod of the camera was hold by the man in a horizontal axis.

Nadir and Zenith Shot (Fig 9). Nadir shot is taken from the ground level. Zenith shot is made from "above" an object, location or subject.

Horizontal Axis (Fig 10) The location of the camera in horizontal position with respect to the ground can give a feeling of flying, lying on the ground or falling. This choice is very delicate. The loss of the horizon and the sense of

Figure 4 Frame of NN 1 Scene 2 "Premonitory Dream". Example of First Person Shot.

Figure 5 Frame of NN 12 Scene 2 "Ordeal". Example of Natural Eyeline Shot.
Figure 7 Frame of NN 10 Scene 1 "Revelation". Example of High Angle Shot.

Figure 6 Frame of NN 9 Scene 2 "Wrong Approach". Example of Low Angle Shot.
Figure 8 Frame of NN 7 Scene 1 "Oracle". Example of Medium Shot.

being on the ground can lead some people to suffer from motion sickness. During the scene “Death of Lorenzo”

On Set: The Scene is The Stage

The shooting approach changes radically from the cinema logic. Shooting in 360º gets close to stage management in theater. The scene is the whole stage and at the same time what is happening within it. In the case of ZENA, the workflow consisted in:

Setting (Figure 11): The configuration of the set and the location of the camera according to the description of the scene, designating the location of the key elements, characters and key action within the spherical environment according to the position of the camera. For the shooting of ZENA, we used two cameras with a field of view of 180º each, giving us one stitch zone, the area in which the image of both cameras merge. For the setting, it is important to take into consideration the stitch zones so as no key element will be located on it. Figure 9 shows the position and height of the camera in the stage, and the position of the character. The front camera is directed towards the place where the central action of the scene will take place. The back camera is directed towards the area where Lorenzo will enter into the scene/stage. Lorenzo’s final position will be next to the Master, who is already in place.

ZENA was recorded on the streets of Genoa during day time; sometimes it was allowed to people not involved in the film to pass through, as it happens in the daily life of a city, some other times, especially during the scenes with dialogue, we closed the entrances to the zone in which we were recording.

Because of the novelty of the media, most of passerby were not able to identify the camera. Therefore, in the moments when the actors were not performing the scene, they would cross the scene without reacting. This would preserve the life-like sense of a scene set in the trafficked old alleys of Zena. On the other hand, when a scene was being acted out, most of the time they would react to the character’s actions. They could see something “strange” was happening but they would not understand what was going, because they could not identify the object they recognize as “a camera” neither an audience attending a performance. Again, this would often help and enhance the scene. The times this did not work were those in which passerby understood something was happening and would stop and stare. This could not fit in the narrative we created, and the scene would have to be repeated.

Measuring Distances (Fig 12): Once located the camera, we used a meter to check if the distance between the camera and the characters was consistent with the director’s intentions and the description of the scene. The distance between the starting and destination points were slightly marked on the ground. These marks had two functions, (1) to give the actors a guide to move in the space, and (2) to keep a record of the audiovisual consistency among scenes.

Rehearsal on Set (Fig 13): Having all prepared, we needed to rehearse on set, for one main reason: without a real time monitor to check the scene while it is being recorded, or a place to hide inside the scene to watch what was happening during the recording, all the team had to leave the set except the actors. In some cases, we did have a place to hide from the camera so we could look if the scene was fine or not, but many times this was not the case. The actors rehearsed not only for performance purposes but also to show to the director and the crew how the scene was going to develop, especially in those scenes that were designed for the actors to move across the stage so the viewer is forced to move around following the characters.

Action!

Once microphones, audio and camera recorders, as well as actors and crew, were in position, the Action! was given. The actors had the instruction to give at least 30 seconds before and after the action was developed, if the scene didn’t contain an interactive moment, i.e., the moment to choose among different paths. In that case, actors were asked to keep the emotion of that final moment, especially the avatar character, in ZENA’s case the main character Lorenzo, the one who follows user’s choices. Lorenzo expressed the moment of choice with his face and body movements, e.g. by pointing gesturally where the hotspots were located or showing indecision between two characters, while the other characters were holding the last emotion or situation. The icons for interactive options were then set in post-production.

In ZENA’s case, we had to trust our actors in those scenes in which the crew did not have a chance to directly check the development of the performance. The actors helped the director to know if the scene was as rehearsed, not having the possibility to check the material on set. Even though we protected our locations from external interferences (e.g. street loud sounds or people passing through). Nonetheless, as one of the intentions of ZENA was to give a sense of the real city inside the experience, we kept some scenes with passers-by, talking on the phone or looking at Lorenzo with perplexity.

Conclusions

ZENA’s final experience is an interactive cVR hero’s journey, that can take from 10 to 20 minutes, composed by 17 NNs and 25 scenes, recorded in 13 different locations of the old town of Genoa. The shooting, that took 3 and a half days, allowed us to understand how to move into the space and work efficiently. The first scenes were the most difficult to set, while the crew got used to the new filmmaking workflow; after three or four scenes, all members of the crew were very quick to adapt to each location and to perform their work properly, using the interactive screenplay and understanding the requirements of each scene. From this experience, we can identify positive outcomes and some challenges to face in next productions:

The Interactive Immersive Screenplay Heading: The new composition of the Master Scene Heading allowed the crew to work efficiently; it was easy to understand for any production role. In particular the items: Narrator Type and Interaction Type, as well as for the Input/Output items.

(1) The Narrator Type (NT) item in the Master Scene Heading allowed us to understand the position of the camera, its height and location.

(2) The Interactive Type item supported understanding for both crew and actors of where and how the end of the scene would be conducted.

(3) The annotation of the Inputs (previous nodes) and Outputs (successive nodes) helped the crew to organize the shooting plan and to have a clear idea of the scene under development, since the scenes were not recorded in the chronological order of the story, but following the production needs of setting the shooting according to the geographic references of each location.

The Frameless Image and the Director Role: A 360º virtual environment where user chooses where to look at has been one of the main issues that traditional video/film makers face when trying to experiment with cVR: How can I (author) focus the attention of the viewer to what I want them to see? In the first place, there has to be a switch between the traditional logic to the cVR logic. In cVR the user is surrounded by the audiovisual image and the director

Figure 9 Death of Lorenzo. Unused Scene. Zenith shot from the frontal camera.
Back camera is a Low Angle Shot of the neighbor that observes Lorenzo's death from a window

Figure 10 Death of Lorenzo. Unused Scene. View of the street from the horizontal axis.

Figure 11 Setting the scene. Backstage of NN 1 Scene 3.
The front camera is directed towards the main action of the scene.

Figure 12 Measuring distance from the camera to the actor's position. Backstage of NN 10 Scene 1.

Figure 13 Rehearsal on set. Backstage of NN 13 Scene 1. Actors are rehearsing on their final positions while director gives some instructions.

Figure 14 NN3 Scene 1. Arrival to the New World. Director giving the last instructions to Lorenzo before the Action!. Lorenzo is holding the camera/magic cane as NT 2 indicates for this scene.

needs to take into consideration not only the audio and visual inputs but the whole embodied experience of presence in the scene.

Technically, from the audiovisual point of view, we propose two ways for overcoming this issue:

(1) Position of the camera: The position of the camera should take into account the Narrator Type. The NT will determine where the camera need to be situated and if it will stay for a character inside the storyworld. In addition to the NT, the height and distance of the camera from key characters, objects, sounds or situations determines semantic similarities with different types of shot on framed audiovisual narratives. The semantic meaning of the position of the camera expresses director's intentions.

(2) Management of the stage/scene: In cVR the stage is the scene, actor movements, key elements, sounds and situations inside the 360º space should be carefully designed to enrich the scene. Even small details, like someone looking through a window on the 4th floor, add narrative density to the scene.

The Shooting Workflow: When working with a budget, a group of people, and a story to tell, it is important to know how to manage time and resources. In order to meet the production plan and create the scene according to the script and director's intention, it is necessary to consolidate a clear work dynamic for the team, which can be applied in each location. Our workflow takes into account the low-cost equipment that we used to shoot and the lack of a monitor for the director -and crew- to follow the scene in real-time without being physically present on the stage. Once the equipment was set up (batteries, memory cards, etc.) and in place, the location prepared and the actors ready, we followed a three steps workflow:

(1) Measuring Distances: the task of measuring and annotate the distance between the camera and the characters, situations or key elements (visual or auditory), and the height of the camera from the ground, helps to keep record of the actors' movements and the location of the main action, so as the first visual element that the user finds in the following scene is related to the last movement on the previous scene, assuring a flow between cuts. The annotation of the height of the camera in each scene grants no unexpected visual jumps between scenes, unless it is intentionally part of the narrative.

(2) Rehearsal on Set: it is important for the actors and crew to know the stage and what will be visual and audible shown on it. During the shooting of ZENA, we tried to use space as much as possible by writing actors movements that cover different zones of the sphere. All these movements were marked indicating the initial and final position of an actor's movement. In absence of a monitor to control the developing scene in real time, the rehearsal on set helped the crew, and especially the director, to understand how the scene would be developed.

(3) Action! Moment: once the Action! is given we suggested to our actors to wait at least 30 seconds to start the action and when the scene is over all the crew waited a prudent time to give the Cut!. However, the screenplay takes into account when there is a change of location. In these cases, the scenes start very slow in order to give some time to the viewer to explore the new location.

(4) Decision-making moment: when the user has to choose where to go, or which character to follow, the actors have to keep the last emotion on going, like if they were in holding mode. In this moment, the avatar character, can express indecision between the choices. Its body movements can indicate where the hotspots are

located in the space. For some scenes, we shot the face expression of the avatar character after the decision was taken by the user, so the next scene starts the video clip in which the character goes in the chosen direction or with his face accepts the user decision.

Challenges: From the shooting point of view we faced some technical issues that should be taken into consideration when writing the screenplay. Even though they can be managed by technical meanings, a conscious screenwriting process can facilitate the technical work for production and postproduction.

(1) Adding interaction to recorded videos is still a problem in order to create interactive cVR experiences. The main issue is the decision-making moment: this part of the shooting needs a prudential time so the user can have enough time to make a conscious choice. Being this time given by the duration of the video, this duration has to be carefully measured during the screenwriting, or "hold" or "looped" in post production.

(2) The first person shot or POV is a narrative choice that can lead to difficulties during the shooting. Due to the absence of proper low-cost rigs to set on a person or object, it is difficult to adapt the camera to the eyelevel of the character that is being personified by the camera, or to the object where the camera is located. This issue is indirectly related to the need to have a body that some people feel during VR experiences. Even though Narrator Types 3 and 4 do not require a body, since the user -and consequently the camera- is external to the storyworld.

Further research includes the test of the interactive immersive screenplay model by videomakers and filmmakers both with or without experience in 360º video and interactive video, in order to have feedback about its usability during the shooting of an Interactive VR film.

CAST
Lorenzo: Lorenzo Caviglia
Maestro: Pier Renzo Ponzo
Sercan: Eduardo Losada Cabruja
Simonetta: Serena Zampolli
Church lady: Beatrice Tassara
Oracle: Margherita Friburgo
Drunk man: Leonardo Briata
Hopeless man: Luciano

TEAM
Creator: María Cecilia Reyes
Art Director: Serena Zampolli
Interactive Screenplay Advisor: Giuliana Dettori
Screenplay Advisors: Eduardo Losada Cabruja, Massimo Frattarolo
Original Music: Piero Ponzo
Still images and behind the scenes: Sandro Bozzolo
Binaural Audio: Alessio Dutto
Field Producer: Massimo Frattarolo
Catering: Leonardo Briata

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