

# ARTales- Postmortem

CMU ETC Spring 2019

Client: Chris Klug and Ralph Vituccio

## Introduction and Overview

ARTales is very much a discovery project. The main goal was to discover if AR is a unique and viable storytelling medium. Through that, there was exploration about what it means for an experience to be AR. The final self-imposed deliverable is a 6 minute story driven experience for the Magic Leap to show that AR is a unique and viable medium for storytelling.

The audience for the project consists of storytellers who are interested in new media and new technologies, as we hope that this project will help demonstrate the storytelling possibilities within AR to those who want to explore the medium. The team consists of:

Kristian Tchetchko, Producer and Sound Designer

Wenyu Mao, Designer and Programmer

Nidhi Ramanathan, Programmer and Animation Artist

Chia Chi (Aurora), Concept Artist and 3D Artist

We also had an undergraduate Kate Busatto write our story and Script.

The project was pitched by ETC Faculty Chris Klug and Ralph Vituccio

# What We Got Right

## Production

When we first got together as a team, we realized that we had a huge task ahead of us, as animations of this scale are typically reserved for larger teams. Because of this we made sure that we tailored our scope accordingly, taking into account each team-member's strengths to maximize productivity. Because we all came from different backgrounds, it allowed us to have great success in bringing unique creative ideas to the table. We as a team got along very well, so whenever we encountered a block or other difficulty, we worked together to find a solution instead of shutting down.

## Research

We spent the first four weeks really diving deep into what is special about an AR experience across different platforms. On one hand we did get a lot of inspiration, but most of the AR experience existing today are games, not stories. So it was up to us to figure out what differentiates a game from a story. This was even harder to do because we had to create an interactive story, but after much deliberation we concluded that the key things that differentiate the two are:

- A story doesn't really allow for replayability and change of decisions
- A story can be successful even without a win or lose state while a game cannot
- In a story there doesn't have to be a goal to be achieved.

Another avenue we spent our time researching was the platforms itself. Their advantages, feasibility to develop for and their compatibility with a narrative space was what we considered. The Magic Leap offered a good combination of these factors and helped us bring out the immersive nature of AR storytelling. As a team we did a good job of understanding the limitations of the platform well in advance and planning for it accordingly. This involved a lot of research into its documentation, current experiences and API.

## Art

The portal we created in the wall make for a visually appealing element that utilizes the advantage of Magic Leap while also adding another "AR specific" element to the experience

The visual language and color scheme designed in the concept art are easily recognized after being transformed into 3D in the experience and they also match the setting which is described in the story. We used highly saturated colors, obvious shapes, visual effects and movement to let our virtual objects stand out from the real environment and catch the attention of our guest. We used substance painter for creating the texture. This allowed us to create a lot of detail. For example, like the decoration on heaven portal and patterns on the characters. We kept iterating and polishing the art assets which were not effective enough until they looked like what we expected. All of the assets were clear and recognizable to the guests. The art style was a good match for the tone of the story.

While animating the characters for a medium like AR, it was important to have minimal translation and focus on in-place body movements. To communicate the story effectively, they also had to portray the nature and intent of the characters and their intent accurately.

## Audio

Audio was a very important aspect for such a dialogue heavy experience. Because of this we needed to make sure that the dialogue was of the highest quality. We were able to secure talented voice actors from the School of Drama to voice all of our characters. This gave our characters great depth, believability, and personality that really helped our story flourish. We also used a voice over that helped guide our guests through the experience to ensure that their positioning was correct in space and in story.

Musically, we attached a unique musical leitmotif to every character and set item, which served as an extension of personality and helped fill in any periods of silence. Since many key story actions are repeated, having them also be musically scored allowed our guest to know where they were in any given story moment.

We used spatial audio by attaching all items with 3D audio, which helped the guest locate characters and set pieces much easier, and as characters entered the space, the 3D audio was used as a form of indirect control. To reward guest exploration of the space, we used layered audio techniques to the Portals, so that as one approaches them, not only do they get louder, they also get more detailed sonically.

Lastly, because the guest was interacting with virtual objects, we made sure that we combined physical action with audio cues to solidify positive/negative feedback to guest to negate the missing sense of tactility with great success.

## Programming

Plane extraction; We were able to successfully make the experience unfold without the interference of guest and thus created a more immersive and “AR unique” experience. We were able to mitigate problems of field of view by appropriate placement of portals based on the height of the guest, and adding vignette. Using heuristic functions to place objects on the table with the help of the controller worked very well. The core interaction of stamping has low latency, gives appropriate feedback and is satisfying. We implemented simple hand interactions which are intuitive to create a more immersive experience unique to AR. It was quite magical for some guests when they were able to touch virtual objects with their physical hand. Using your physical hand that you can see to touch virtual objects and have them react is unique to AR. We were able to create a strong and quite seamless connection between the real and virtual world.

## Story

The story was understood by everybody. People had strong views about it, both positive and negative. About 60% of the playtesters understood the idea of self-reflection and felt that it came across in the narrative. Most people were surprised in the end, and most people understood their character role.

# What Went Wrong

## Production

Since none of the team-members had a strong background in story and script writing, our faculty instructors found us a dedicated storywriter to work with. Unfortunately, due to a miscommunication, her role and power within the group was not clear at the start of the project. Faculty and teammates had conflicting understandings due to differing assumptions and interpretations of conversations and emails, so this caused a tension within the group. While it ultimately was resolved, we lost a few weeks of productivity because we were unsure of what work was our responsibility and how we were to collaborate.

## Art

Because of the hardware limitation of Magic Leap, we faced some difficulties in the creating process. The art assets look different between the computer screen and magic leap display in transparency, exposure, shadow

and detail. There is a real-time rendering issue for bump maps that makes objects blurred over a certain distance when displayed in the Magic Leap. We struggled with quality settings in unity. Lumin OS, uses very low quality settings therefore, the blend weight setting needed to be changed to 4 bones. Without this the models and animations would get deformed in the magic leap.

## Audio

Our audio hardships can be divided into two categories, Hardware specific and AR specific. In terms of hardware, the Magic Leap's built in speakers are not up to the task for full and accurate sound reproduction. This required additional tuning of some of our sounds and music to account for device resonances. In addition, either the hardware or software didn't seem to allow for full spatial audio utilization. There was no vertical spatial information available, which caused indirect control issues within the limited FOV. In terms of AR specific issues. Since the playspace environment can vary in size and content due to the guest's space maps, we realized that we were unable to properly tune audio distance curves and audio levels to ensure adaptability to all environments. This was especially an issue since we had items spawning in random locations. Larger rooms didn't have as much of an issue, but smaller rooms very easily got sonically overcrowded and overpowered.

Lastly, since the script was dialogue heavy and it is not advisable for character animations to be overly dynamic in AR, we had some issues in keeping the Guest's attention. We struggled a little trying to make the character animations engaging enough without moving them in the space and could have spent more time on it, if we had anticipated this issue beforehand.

## Programming

Plane extraction was not that accurate. There was a lot of approximation required to detect the table and size of walls. If the scanning of the room was not done, properly, it would cause the objects to stack on top of each other or not spawn at all and the device needed to be restarted. It's important to create a failsafe for situations like this and we couldn't due to time.

We could not spend more time to improve the plane extraction or create a plan B for issues with scanning. We had issue regarding detection of tables and dealing with the use of two adjacent walls. If more time is spent on researching the depths of its possibilities, it might work better.

## Story

There was a lot of confusion about the rules of heaven and hell portals in the world and why the plaintiffs would appear from Hell. Despite our attempts to not align the concepts to any existing norms we had to change our idea and include a 3rd portal to mitigate confusion

Translation from script to implementation didn't always pan out as expected. Eg: Twist in the end; Changes had to be made to make it powerful enough. Moreover, dialogues that seemed fine on paper were too lengthy and sometimes annoying in the experience. There was also a difference in reception of characters on paper as opposed to in the experience due to factors like, style, voice actors and animations.

## Lessons Learned and Conclusions

### Production

When working within a small team, faculty, as well as an external writer, there needs to be clear and effective communication.

Assumption and implied meanings slow down progress and cause unneeded tension between all parties. In addition since this is a discovery project mixed with an animated deliverable, scope discussions really need to be had as early as possible. As a producer, this is especially important, since this was a new medium for most of the team, and therefore they aren't initially able to give accurate time frames for deliverables.

### Research

If more research can be focused on the plane extraction feature of AR, a lot can be done with this Medium. Also focusing on creating an experience that does not rely heavily on large FOV requirement should be looked into.

### Art

If an element is important in the experience, it's animation &/ look needs to be obvious enough to attract the guest's attention, or else it will get lost in the large space. The more we can use to guide the guest and give visual cues, the better.

## Audio

Because your eyes are limited to something like a 40x30 degree field of view, but your ears are still allowed a full 360 degree potential hearing range, a lot of weight and focus and on the audio needs to take place in the planning stages of your experiences. Utilizing indirect control via audio is paramount, especially for mitigating the limited FOV of current AR headset devices. Making sure that all virtual objects that make sound within the space have their audio sources attached to them in 3D space adds to the immersive feel, however there needs to be forethought so that settings within those 3D sources works within all anticipated playspace types.

## Programming

Build up the project on some existing example is helpful. When working with Magic Leap in Unity, the position of the camera must be (0,0,0), otherwise, everything will be shifted in the device.

Working with spatial mapping is tricky and challenging. Due to the limitation of the technology, it's essential to be very careful when customizing the existing plane extraction functions provided by Magic Leap. The current plane extraction recognizes the floor, ceiling, walls and tabletops as fragments, which adds difficulty to locate the position as expected.

Programming in AR requires a lot of run time calculation regarding scales, movements and positions.

## Story

The story needs to be iterated rapidly before production as well as while the experience is being made. The story should take full advantage of the strength of AR, otherwise it will not measure up in strength to the platforms more advanced in technology. Consider the fact that guests may be unwilling to do as you expect due to their fear of messing up. In a medium as new as this one, a little bit of hand-holding is necessary

## **Conclusion**

We've come to the conclusion that yes, AR is a unique and viable medium for narrative storytelling. However, not every kind of experience works within AR. AR's strength is integrating the real world with the virtual, and the guest's personal space is very much part of the experience. Therefore, from the beginning of development, there needs to be an "AR Specific" script created, that takes into account the strengths and weaknesses that we have covered previously. Only then can the story and the experience be successful. In addition, as AR technology continues to evolve, so will the strengths and weaknesses. Perhaps one day a limited Field of View will no longer be an issue, and thus the story does not need to rely on indirect control and FOV-conscious set design any more. Since headset AR is very much still in its infancy, the script needs to take extra care and focus regarding the needs of current devices.