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Environmental Storytelling: Creating Immersive 3D Worlds Using Lessons Learned from the Theme Park industry

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For the past 15 years I have worked as a designer for many theme park, computer gaming, and software companies. In every project I undertake, I am faced with the same challenge, "How do I draw my audience into my imagined world and make them want to stay?" Whether it's a 100 million dollar Disney ride, a 3D shooter, or a kid's entertainment title, it is my objective to tell a story through the experience of traveling through a real, or imagined physical space. Unlike a linear movie, my audience will have choices along their journey. They will have to make decisions based on their relationship to the virtual world I have created, as well as their everyday knowledge of the physical world. Most important of all, their experience is going to be a "spatial" one.

If I have an all encompassing desire for any computer game I play or themed attraction I visit, it is this:

Take me to a place that:

- Lets me go somewhere I could never go.
- Lets me be someone I could never be.
- Lets me do things I could never do!

The Evolution of 3D Gaming

Within the past decade we have been witness to the evolution of the 3D gaming universe. In games such as *Wolfenstien*, *Doom*, and now *Quake 3 Arena*, we can visit and explore worlds on our computer screens that are increasingly dramatic and realistic. The notion of walking through theatrical environments like those found in Cyan's *Myst* and *Riven*, real time, are not that far fetched. Yet, despite our staggering leaps in technology, the game play remains relatively unchanged. We may be transported into ever engrossing and elaborate theatrically lighted cathedrals, but the fact is, we are still simply killing each other. Please understand, I have nothing against 3D shooters. I have spent
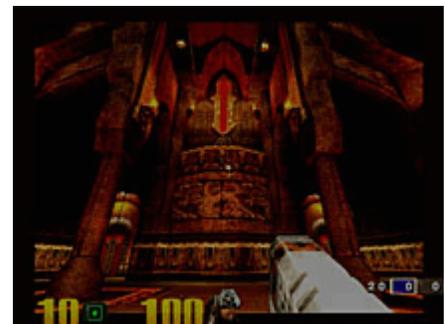
countless hours with a rocket launcher in my hands and know the glories of a low Ping rate. This doesn't change the fact that on many occasions I have been blown to bits because I dared hesitate to admire a beautiful piece of virtual architecture.

Despite these technological miracles, the audience that experiences these worlds are relatively small. Bloodshed and mayhem rein supreme, with many a computer savvy cyber gladiator having to wrestle a 3D accelerator card into the guts of their increasingly obsolete PC. But, times are changing, and it seems that we are on the brink of an untapped market potential. With more PC's coming onto the market with 3D accelerators built in, it is quite possible that your everyday Joe will have the power to visit increasingly realistic worlds from their desktop.

Theme Parks and the Virtual World

Prior to the mid-1990's, my experience and interest in the computer gaming world was marginal. Not until the release of games like *Myst* and *Doom* did I fully see a potential bridge between the theme park world I was working in and the world of the computer on my desktop. As my professional computer experience has grown, so has my belief that the two worlds are not that far apart. True, their audience demographics may be slightly different, but in many ways they face the same challenge: How to bring people into their created worlds and keep them immersed and entertained. Now with the growing popularity of multiplayer and internet games, computer environments are treading on a realm, until now, reserved for the physical world. Many thousands of people are connecting and participating in these virtual worlds with total strangers for one reason.... namely, the allure of the "shared" experience. A chance to make a human connection in these new worlds and to be able to say, "HEY! Did you see THAT!?"

Because of this, there is a lot of knowledge that should be shared between these two seemingly different industries. Amusement parks have been entertaining people for over a 150 years. In the past 50 years theme parks like Disneyland, have taken the art of spatially entertaining people to new heights. No longer are rides simply a short lived thrill, now guests are fully immersed in stories, where they play the main character. Over the years these designers have developed tricks and trade secrets that (from experience) they know will work.

Environmental Storytelling

One of the trade secrets behind the design of entertaining themed environments is that the story element is infused into the physical space a guest walks or rides through. In many respects, it is the physical space that does much of the work of conveying the story the designers are trying to tell. Color, lighting and even the texture of a place can fill an audience with excitement or dread.

Much of this is done by manipulating an audience's expectations, which they have based on their own experiences of the physical world. Armed only with their own knowledge of the world, and those visions collected from movies and books, the audience is ripe to be dropped into your adventure. The trick is to play on those memories and expectations to heighten the thrill of venturing into your created universe.

The Importance of Story

The first secret is "story." When I say story I am not talking about a linear "once upon a time" type story. I am talking about an all encompassing notion, a "big

walks or rides through. picture" idea of the world that is being creating. A set of rules that will guide, the design and the project team to a common goal. It is this first step that will insure the created world will be seamless. If you are creating a game or attraction based on, let's say "pirates", you'll need to play your audiences expectation like a violin. You want to pamper them by fulfilling every possible expectation of what it must be like to be a pirate. Every texture you use, every sound you play, every turn in the road should reinforce the concept of "pirates!" If you successfully establish a strong enough "story" early on in your design process, you will have little trouble keeping your team focused. If you break any of the rules, more often than not your team will argue, "we can't put that in there, that's not at all 'piratey'!"

Most important of all is once you have created this story, or the rules by which your imagined universe exists, you do not break them! These rules can be broad, but if they are broken your visitors will feel cheated. They will be slapped in the face with the contradiction and never again allow themselves to be as lost in your world as they may have been at the onset.

"Where Am I?"

In the telling of your "story," the next most important task is to answer your audiences first question.... "Where am I?" No matter how well designed your environments are, if your audience can not answer this question in the first 15 seconds, you are already lost. This can be as simple as "Oh, I am in a dark warehouse." or "Ah, I am in the hold of a ship." Wherever it is, your first job is to present your audience with the opportunity to answer this question for themselves.

Your next question to answer is "What is my relationship to this place?" No matter how gorgeous your medieval castle, or abandoned space station might be, if they can't figure out what their role is in this place, you have missed out on a marvelous opportunity to pull your audience deeper into your world. This need not be done with lengthy CD liner notes or costly Intro AVIs. Clues can be left throughout your environment. Although you may not know who you are, you should be able to begin to have a notion based on your initial location. Valve's *Half Life* does an award winning job of playing with the player's desire for self identity, but only lets them come to a conclusion through their experience of the physical space and random encounters with peripheral game characters.

Self discovery can be even more enjoyable than having the story spelled out for you in the opening credits. There are lots of ways designers can place story elements throughout their environments to lead their audience to conclusions designed into the games plot.

Storytelling Through Cause and Effect

One of the most successful methods for pulling your audience into your story environment is through the use of "cause and effect" vignettes. These are staged areas that lead the game player to come to their own conclusions about a previous event or to suggest a potential danger just up ahead. Some examples of "cause and effect" elements include, doors that have been broken open, traces of a recent explosion, a crashed vehicle, a piano dropped from a great height, charred remains of a fire... etc. These "cause and effect" bits of storytelling can help the game player better understand where they are and what they might expect to experience further on. Putting in an element just because it is "cool" misses a vital opportunity to use that element to help further your story along.

"Cause and effect" elements can also depict the passage of time. A game character may return to a place that they had become familiar with earlier in the game, only to find it completely altered. This may be due to a cataclysmic event, or the disappearance of elements remembered from a previous visit. "Cause and effect" elements could also be triggered directly by the actions of the game player.

The best examples are found in games like *Half Life* and *Duke Nukem 3D*. In the case of *Duke Nukem*, the game player reaks havoc on his environment, blasting toilets, setting fire to palm trees, and making Swiss cheese of many architectural elements. After a lengthy Deathmatch, there is not doubt as to what has transpired in Duke's futuristic Los Angeles.

Another example of "cause and effect" is the use of what I call "Following Saknussemm." Derived from the story *Journey to the Center of the Earth* by Jules Verne. In Verne's story the main characters follow a trail of symbols scratched into subterranean walls by their adventuring predecessor, a sixteenth century Icelandic scientist, Arne Saknussemm. In this way, the game player is pulled through the story by following "bread crumbs" left behind by a fictitious proceeding game character. Whether you create notes scattered throughout your environments, or have the game player follow the destructive path of some dangerous creature, "cause and effect" elements will only heighten the drama of the story you are trying to tell!

Half Life **is an excellent example of cause and effect elements triggered by actions of the game player.**

The Power of Designing the Familiar

Another powerful trick is to use the familiar in your designs. If your goal is to create an environment that is totally alien, it pays to periodically give your audience something familiar to anchor them themselves to. All too often, game designers will create a level built entirely of pulsating walls of intestine like material. Although the concept of such a place may sound "cool," it does more to alienate the game player than draw them in. If you can periodically give them some reference point... such as, "Oh, I am in a spaceship" or "Hey, this must be the engine room" you will be doing them a great favor. Even something like "Wow! These look like alien toilets!?!" will bring your audience back to relating to the environment, and even lend a little humor.

Remember, This is a Theatre!

**The buildings in the "Pirates of t
he Caribbean" attraction at Disneyland, despite appearing solid are entirely made of painted stretched canvas and example of clever theatrical magic**

On several occasions I have had a chance to walk through the "Pirates of the Caribbean" attraction in Disneyland, CA. During my first visit, I took a breather in the "Auction Scene." As I leaned back against one of the Caribbean stucco buildings I was shocked to discover they were entirely made of painted stretched canvas! All through my childhood I had just assumed that the buildings were solid, and even today it is hard to remember they are only clever theatrical magic. It is important to remember that the virtual world is no different than a theatre stage or a film set. Although we don't use canvas and paint, we can learn much from the tried and true tricks handed down to us by 2000 years of theatre. Texture maps are our canvas sets and how we choose to use them will make or destroy the story we are trying to convey. Texture maps are not wallpaper, but our tool to trick the eye. Even though dynamic lighting is one of the many luxuries of the new 3D technology, don't let lighting dictate how an environment appears to your audience. If your texture has architectural details that are carving into, or stick out of the two dimensional surface, it pays to paint in the necessary shadows to help heighten the illusion of depth an drama. The more you can achieve in your texture maps the fewer polygons you will waste on frivolous details.

The design mantra "Less Is More" applies. Refrain from cluttering your spaces with complicated,

busy, or loudly patterned textures. Visual complexity is a luxury that should be used lightly. Pick and choose where you place your accenting textures, and down play simpler patterns. Use your details as architectural arrows that help lead your audience from one space to another. One trick is to save your most decorative elements for areas you wish to draw your audience to. Rather than cluttering an unimportant corridor with gorgeous ornamentation, simply save one detailed element for the end of the hallway and let it draw your audience, like a dangling carrot, into the next space.

Another pitfall to be weary of is the overly illuminated environment. After a map builder has painstakingly finished a level, it is understandable that he/she should want to show off every nook and cranny. Unfortunately, too many lights flooding an environment washes out and flattens the illusion of depth. Just like a flash photo removes all sense of mood or drama, so does a map that's lighted like a Walmart. Don't be afraid to loose large areas of your map in shadow. Of course it is important that you do not hide vital game elements in the gloom, but use your lights to draw attention to only those things that are most important to your story!

It is easy to see that lighting can create marvelous dramatic effects, but the same can be true of the placement of props and objects. A large room with a single shaft of light illuminating a solitary prop is more effective than a room filled with detailed elements. If you have an important "cause and effect" prop you wish to highlight, compose all other textures and props in the space as merely supporting players to the important Story element. Be careful not to confuse the game player with too many choices at any given time. Though it is you who has orchestrated the environment, when it is done right, the game player has the illusion that they are in complete control of their character's destiny.

Using Contrasting Elements to Your Advantage

If you have ever visited a medieval cathedral or even a large old church, there is a reason the vast interior is so awe inspiring. What you may not realize when you enter, is that the architects of these places have forced you to enter the church through a small confined space, before revealing the monumental interior of the main church. This in done quite on purpose, and it is the contrasting effect of having been confined in a small space that makes the adjacent room all the more dramatic.

Contrast is another tool in the environmental designer's bag of tricks. Whenever possible, create variety in your spaces. Force your audience to wander through a cool lighted space before dropping them into a hot one. Give them the experience of disorder before you deliver them into a place of order. And above all, give them asymmetry whenever possible. The world we live in is far from geometrically perfect, and spaces where every chair, desk, and potted plant is lined up in a grid only helps emphasize how fake your world really is! This is the same with your architectural interiors. Many architectural monuments can be perfectly symmetrical, but in our lives little else is. If you must create a long expanse of repeating pillars, or some such element, make one unique among the rest. Nudge it out slightly, or knock the thing right over, it will only add life to an otherwise mathematically perfect, but boring, environment.

The Paradox of Designing Environments for "Gamers"

One challenge to designing successful environments in the computer is working in and around the expectations of your main client.... mainly "gamers." I had an experience of art directing an Indiana Jones type game for a gaming company. After painstaking work on making the environments as realistic as possible, I walked into the lead programmers office to witness my carefully rendered torch flames flickering at an unrealistic lightening pace. When I complained, the Programmer proudly argued that he had done it for "the gamers." To be specific, he wished to show off the remarkable frame rate of the game, and felt that "gamers" would appreciate the visual effect of a high frame rate over the realism of my environments.

Needless to say, there is a fine line between fulfilling the desires of creating a beautiful game, and creating a game that people will want to play. No matter how stunning your environments might be, if it's no fun, no one will buy it! The same is true of the layout of a particular space. Designing environments that optimize the enjoyment of firing rockets, may not be one that tells a slowly evolving story. This does not mean that we should be left with spaces that are no more than strategically placed platforms, no matter how ornate the decor. It is within these challenges that a team can lean back on a strong story. If you are creating arenas for gladiators to blast each other to bits, play up the gladiator arena aspect of the game rather than guild it in unrelated ornate textures. Above all, make the game playable, but use your knowledge and story to support the enjoyment of your game rather than confusing it.

I have also had the experience of working with team leaders who can only articulate their desires as "Make it more 'edgy' or "It's not awesome yet, I will tell you when it is." Sadly, I do not have foolproof advice to combat such statements, it's a part of this industry. I do however know that if you can establish a strong story, one that your whole team can agree on, arguments are usually relegated to small details rather than gutting and overhauling the look of the game 3 months before it ships!

The Advantages of Computer Environments over Theme Parks.

There are several things that virtual environments can give you that theme parks can not. Foremost is the expensive limitation of building in the physical world. theme park designs need to take into consideration the necessity to push as many people an hour as they can through their various attractions. One attraction alone can cost a 100 million dollars to build, and takes millions more per year to just keep it clean and running. Theme Park experiences run from 30 seconds to 15 minutes in duration and could never rival the 40 hours spent wandering the islands of *Myst*. Theme parks must always be aware of safety, so my Lara Croft back flips off 10 story cliffs are out of the question.

In theme parks *Tomb Raider* style back flips off 10 story cliffs are out of the question

As a theme park designer, I have had to battle hard and fast to add more expensive themed light fixtures to a particular attraction, while in my computer environments I can just cut and paste. In the computer I am only limited by the number of polygons my machine can crunch and how willing I am to slow my progress down in favor of a room full of themed lamps. I am also reassured that as technology and computer processors get faster, my environments will be even richer and more detailed.

One area the computer has yet to master, is the physical experience of sitting next to your friend, parent, or loved one, and truly "living" through your adventure together. Sure, we can holler over our cubical at Johnson in accounting as we nail him with a rail gun, or wander through *EverQuest* with players in Japan, Austrailia, and Moscow, but we still can't sit close to our loved ones and friends and experience our adventure together. Goodness knows, one day we will!

Missed Opportunities

For the time being, the ability to create virtual worlds is relatively new to us. I have no doubt that in the years to come we will continue to blaze new trails deep into this entertainment medium. Although we break new technological ground with every year that passes, I still find that I am left wanting. I long for the day we break away from rambling labyrinths for their own sake, whether they are dungeon passages, back street alleys, or miles of sewer pipes. I look forward to visiting virtual places that tell me more about where I am and what I am supposed to do. I want to use my wits and knowledge to get myself out of tight spots, and never again have to twitch my way

through timed puzzles that force me to repeat my actions over and over to simply reach another level of the game.

With the growing popularity of multiplayer games and the promise of higher band widths, I relish the day I can meet friends and explore these worlds together. Places where our success isn't measured only in frags, and our rewards aren't merely based on how many fire beetles we have killed. I look forward to the day when the act of exploration actually builds relationships between it's players. I want my character to be tested. I want to be given the choice of sacrificing myself for a higher cause, or sacrifice others for my own petty rewards. I want to be given choices that test my relationship with other players. Force us to work together for a common goal, pull us apart, then bring us together, and make us pool our mental and emotional resources to get through this adventure in one piece.

In closing, I want to say that I relish the years to come. I can't wait to see what virtual worlds you will have created for us to explore. Push that envelope and bravely challenge the "way it has always been done before." Use your environments to draw us in deep, and build on the strength of a good Story, making it the back bone of your project. You have the power. You are the storytellers. Now......

- Take us somewhere we could never go.
- Let us be someone we could never be.
- Let us do things we could never do.

Don Carson is a freelance designer and conceptual illustrator. For many years Don worked as a Senior Show Designer for Walt Disney Imagineering, the theme park design arm of the Walt Disney Company. Some of the attractions he helped to design are Splash Mountain for Walt Disney World Florida, and Mickey's Toontown for Disneyland California. Don continues to work as a consultant for Disney from his studio, as well as for companies like the Jim Henson Co., Universal Studios, Microsoft, Zowie Intertainment, Sierra, and Coca Cola. You can reach him at: djcarson@aol.com, or visit his online portfolio at: http://home.earthlink.net/~dccreative

Environmental Storytelling: Creating Immersive 3D Worlds Using Lessons Learned from the Theme Park Industry. By Don Carson. For the past 15 years I have worked as a designer for many theme park, computer gaming, and software companies. In every project I undertake, I am faced with the same challenge, "How do I draw my audience into my imagined world and make them want to stay?" Whether it's a 100 million dollar Disney ride, a 3D shooter, or a kid's entertainment title, it is my objective to tell a story through the experience of traveling through a real, or imagined physica Environmental Storytelling: Creating Immersive 3D Worlds Using Lessons Learned from the Theme Park industry. Article. Jan 2000.Â Imitation Learning, while applied successfully on many large real-world problems, is typically addressed as a standard supervised learning problem, where it is assumed the training and testing data are i.i.d.. This is not true in imitation learning as the learned policy influences the future test inputs (states) upon which it will be tested. We show that this leads to compounding errors and a [Show full abstract] regret bound that grows quadratically in the time horizon of the task. We propose two alternative algorithms for imitation learning where training occurs over several episodes of Don Carson: Environmental Storytelling Creating Immersive 3D Worlds Using Lessons Learned from the Theme Park Industry Theory: Basic discussion on how a game can have interesting content. Practice: Good ideas on how to do this. Richard Rouse: Storytelling Theory: Not much. Practice: Broad introduction. Wibroe, K.K. Nygaard & P. BÃ¸gh Andersen: Games and Stories.