

## Interactive Imagination: Tapping the Emotions through Interactive Story for Compelling Simulations

Training simulations and entertainment are really the same thing. ... They are both about making memories that you will never want to forget ...

—Michael Macedonia, Scientist, US Army

**M**ost compassionate parents, teachers, or coaches will echo the belief that you must spark the imagination or touch the heart to teach the mind, train the body, or inspire a sense of wonder. This is also the storyteller's craft. How can we use story within interactive simulations to better teach, train, or inspire? Now that science and technology can make simulations more realistic, how can art make them more compelling through interactive fiction? The key is to use story to tap the depths of emotions, engaging the user's desire for exploration, learning, challenge, and adventure. In the new domain of training, story becomes the means more than the end.

Can the compelling art of story transition from the passive media of motion pictures to the nonlinear interactivity of simulation? This is venturing beyond the reactive branching of cause-and-effect games or choose-your-own-ending adventure stories. This process is about the unpredictable expressiveness of audiences exchanging discourse with the author mediated through the digital media—the story engine.

### Experiential motion picture trailer

We express our desire to take the creative leap from the theoretical to the practical by tackling the challenge of transitioning the most compelling storytelling medium of motion pictures to mixed reality—one of the most advanced forms of interactive immersive technologies (see Figure 1). Using Canon MR System Laboratory's video see-through head-mounted display, we were inspired by New York City's Brand Experience Laboratory's challenge to create an experiential movie trailer (a montage of film clips for use in marketing) to promote the entire movie franchise including games, theme parks and books. We wanted to know whether we could produce an interactive, immersive mixed reality experience that has the same impact as a motion picture, yet on a smaller scale.

A movie trailer is an ideal experimental genre. It's a concentrated extract of the essence of story. It has the emotional impact of the movie; its entire screenplay is the movie's tag line set to an overture of music and action. It's short and sweet; it has a beginning, middle, and end; however, it has more to do with craft than art. It also represents the most powerful branding of our generation—emotional branding (the use of characters and endearing stories to sell everything from shampoo to Disney dollars). This, combined with the growing use

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John Nadeau, concept artist, © 2003 UCF/MCL

1 Mixed reality  
concept sketch  
for an experiential  
entertainment  
trailer  
venue.

## 2 Virtual still from an experiential entertainment trailer.



Scott Malo, media artist, © 2003 UCF/MCL

of experiential branding (the use of themed experiences to entice shoppers to buy), is aimed at the savvy and hard-to-reach consumer of the future.

But how do we structure a story engine that can emotionally drive an interactive trailer such as the one shown in Figure 2?

### Expressive versus computational

Stories are about emotions. Whether provoking, evoking, or expressing, an author uses emotions to drive the characters that entice the audience into wanting the story to unfold. To deal interactively with an audience through story, you must channel their expressive participation, which includes their emotions. The technological limitation of passive media inherently distances itself with the imaginary fourth wall (the space separating the audience from the action of a theatrical performance, traditionally conceived of as an imaginary wall completing the enclosure of the stage). The effect is that passive media fails to listen and respond to the emotions that it evokes from its audience.

Computers are about procedures; they could care less about your emotional state. However, even a procedural approach can provide capabilities to interact on behalf of the author. The challenge is how you can mediate between the author's intent and the audience's emotions and curiosity in a computational procedure? Interactive theater succeeds because you have a live, trained actor with human intelligence to successfully mediate the scene. It takes both scientists and artists to devise a method that works as part of a more automated process.

When considering this process, we must remain cognizant of the fact that we never want the computer to tell the story. The computer's role is to mediate between the author's intent and the audience's desire to invest into that story. This is a key to interactive story and how interactive theater with critical roles for authors, actors, and audience members is the ideal model to leverage the interactive imagination with a procedural story engine.

### Interactive versus passive imagination

Telling a story effectively is as much about drawing from the audience's imagination as about creating a

good script and delivering a powerful performance. Earnest Hemmingway once compared a good story to an iceberg. He believed that a book represents only the tip of the iceberg and that three quarters of the story is "beyond the page." In other words, what makes a story rich (the part beyond the page) is what the readers bring to the story experience with their own imaginations.

The craft of story is as much about engaging the audience's free flowing imagination through directing their emotions as about serving the author's intent. The freedom of reading a book leaves substantial room for the reader to fill in imagi-

nary details that make the story more compelling by connecting with one's own memories. The author uses that investment of imagination and memory to suspend one's own belief system in exchange for another, using the readers' emotions to transport them to an alternative reality. As Jeff Wirth, author of the book *Interactive Acting* (Fall Creek Press, 1994), puts it: "An interactive performance does not rely on the suspension of disbelief, but an investment of belief."

Without the audience's contribution, the limitation of passive media has motivated directors to rely less and less on the audience's imagination. Filmmakers fill in all the details themselves with their own creative ability to produce magnificent displays and special effects that capture rather than engage the imagination. As a result, passive media negate the need for any contribution from the audience.

Now, with the ability of simulation to interactively engage the entire mind and body, we can awaken the multisensory, full-bodied, real-time interactive imagination. To accomplish this, we must develop and employ artistic conventions to craft a story that involves whole body and mind audience participation to bring forth the possibilities of interactive story. The evolution of artistic convention will rely on the convergence of traditional conventions as well as it does in the creation of new ones. One of the main challenges is employing computer mediation to develop dynamic procedural story engines that translate interactive story into digital scenarios across multiple dimensions and senses. Our framework taps into the convention and techniques of interactive narrative based on an array of interactive entertainment venues.

### Passive versus interactive narrative

The foundation of our computer-mediated stories relates to what Janet Murray describes in *Hamlet on the Holodeck* (MIT Press, 1998) as components of the multiform plot. Interactive narrative requires mediation between the encyclopedic, the procedural, and the participatory. Actors, as well as computers, must implement the author's intent (encyclopedic) with calculated precision (procedural); audiences bring their unpredictable

**Table 1. Interactive story infrastructure of conventions (taken from C. Stapleton, C. Hughes, and J. M. Moshell<sup>1</sup>).**

Roles	Goals		
	Authoring (Encyclopedic)	Agency (Procedural)	Acquisition (Participatory)
Author (Content)	Passive media	Video games	Artificial intelligence
Actor (Mediation)	Improvisation	Passive media	Interactive theater
Audience (Experience)	Role-playing games	Participatory theater	Passive media

emotions and imaginations (participatory). In other words, we have authors, actors, and audience members each providing authorship, agency, and acquisition of the story.

This approach goes beyond the rigid assignment of passive media where the author only authors, the actor provides the agency, and the audience is quietly acquiring the story’s intent. With interactive narrative, the players need to expand their roles to engage the entire interactive spectrum. Story needs infrastructure as well as structure.

To mediate the convergence of artistic conventions and techniques, we have mapped these relationships in the matrix shown in Table 1. We identified various forms of media that excel in a particular aspect of these roles and goals, even though many media forms span several cells. The intent of our interactive story research is to mine all of these media techniques to allow interactive stories to transcend their traditional boundaries. This is a feat whose most successful fruition has been achieved within interactive theater.

Like a book, the story engine is the extension of the author’s intent; it mediates contributions from others without undermining their original intent. Even with the audience authoring in role-playing games, the participants’ extensive contributions still stay true to the core story’s intent. Unlike a book, a story engine needs procedures that let the author evaluate and use feedback acquired from the audience. In this context, the author relies on behavior models and artificial intelligence in lieu of physical presence, and the story engine becomes the extension of the author’s evaluation and decision-making process. Participation from the audience doesn’t mean that the author gives up responsibility for creating the story. Audience participation is about an emotional investment to make the story experience stronger and not about constructing infinite plot possibilities. The engine provides the tool for audience evaluation to the author, triggering story devices and leveraging the audience’s state. The new challenge in authorship is in keeping the audience’s focus on the author’s intent through desire and not a lack of options.

### Plot points versus emotional waypoints

Our story follows the archetypal Hollywood story structure of the beginning, middle, and end, loosely drawn from the expertise of Robert McKee in his book, *Story: Substance, Structure, Style and the Principles of Screenwriting* (Harper-Collins, 1997). We use classic plot points for stories:

- **The beginning** establishes the main character’s ordinary world with which the audience members can identify, transferring their emotions to the story’s character and world.
- **The inciting incident** is a strategically placed event that pulls the rug out from under the main character, propelling the character and story forward, producing circumstances that force the character to a point-of-no-return, initiating the character’s quest.
- **The middle** is a journey of an escalating series of risks and rewards, placing the ordinary person into extraordinary situations.
- **The climax** is the inevitable life or death confrontation sparked by the inciting incident.
- **The ending** comes to the point of either resolution or evolution, and the ultimate transformation of the character.

Whenever a story transitions from one medium to another, the story’s essence must retain the same intent; however, the transformation must take advantage of the new media capabilities. The capability of interactivity has unbounded variations. As an experiential media piece, the story is no longer a film, but it has the same story structure, which must transition from passive to interactive. This structure is based on emotional transitions and not on a linear plot that tracks only one point of view, as would occur in passive media. With interactivity, the beginning, middle, and end become emotional waypoints in the scenario, dependent upon the audience’s transformation through the character’s action and situation. Varying from passive media, interactive media provides for unlimited possible paths to the same end that the author might not completely anticipate. The emotional waypoints for storytelling aid these transitions:

- **In the beginning** the main character gains the audience’s empathy to become a surrogate for their emotions by first identifying with a common struggle.
- **The inciting incident** happens once the character has a firm grasp of the audience’s heart and propels the story, participant or character into what Alfred Hitchcock describes as, “the ordinary man in extraordinary circumstances.”
- **The middle** is the emotional roller coaster where the author gradually escalates the cause and effect of the conflict and drama to convince the audience to join the main character in risking their lives, (abstractly, of course), knowing the odds are against them.
- **The climax** is the pure thrill of not suspending one’s disbelief, but totally investing in an alternative belief



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to feel the character's pain, euphoria, and emotional transformation.

- **The ending** is not winning, that is a part of the climax. The ending is finding the emotional closure and confirmation that the apparent mistakes the character and audience have made were really the best choices in the end.

Although interactivity can undermine the plot line (in that way it's not a film), it can still hold true to the author's emotional intent (which still makes a good story). The misnomer in the past is that the audience could choose the ending, the most important part of the story! That undermines the author and makes it no longer a story but an amusing narrative game.

### **Game versus story**

But what differentiates between a story and game? Are they diametrically opposed? Are they two sides of the same coin? Are they opposite sides of the same spectrum? Games and stories both deal with conflict, drama, and confrontation, and they elicit emotions of joy, anger, and frustration. However, any seasoned professional will tell you that too much story will kill a game and too much game will kill a story. Where is the difference between a story serving a game and a game serving a story? The answer also lies in the author's intent.

Games are about *me* (or we). "I am the most important player" and "the purpose of this game is about my winning." The game designer's intent is for me to amuse myself as much as possible in this process. If I take risks, and lose, that is just an emotional ploy to make winning that much more powerful. To heighten that emotional state, game designers use story to serve the game.

Stories are about *thee* (or empathy). I invest in thee or give up myself in service to the character, which is the vehicle of the author to take me where I have never been nor ever would have thought to go. It doesn't mean I have to be a passive participant to enjoy (à la film). I exchange my belief system for that of the fiction. To make that interactive, I need the intuitive interactive technique of games. Storytellers use games to serve the story. Once an artifice overshadows the author's intent, it destroys both the story and the game.

### **Geeks (scientists) versus freaks (artists)**

Solving interactive story with experiential media is beyond the realm of the literary writer. It involves designers, composers, dancers, actors, and now even computer scientists, who contribute creatively to interactive story research. Computer scientists seek solid science- and methodology-based systems that meet stringent performance criteria. When dealing with storytellers, they don't ignore their users, but often fail to understand them, despite the best of intentions.

Artists could care less how a story is delivered at a technical level. Of course, algorithmic efficiency is important in meeting the goal of a smooth performance, but it's difficult to get excited about the science if the show is not delivered according to the artist's intent. The problem (that is, one of the problems) is that the languages and the cultures of geeks and freaks are so different. In particular, a procedural description of a story, as provided by storytellers, generally depends upon the experience of the story's actors to attain any degree of precision. Programmers want precision, even when creating randomized behaviors. For instance, even the simplest blocking instructions such as, "the character will start from point A and run to point B after fidgeting for a while" elicits many questions, including "How long is a while?" and "Do they run together in a single line or do they move at varying speeds?" The artist's explanation can create more questions than answers for the scientist. How can one interactive scripting standard speak for both extreme forms of expression?

Art is a lie that reveals the truth....—P. Picasso

Science is the truth that reveals the art.—C. Stapleton

Our team members are on a constant quest to understand each other and create a common language of discourse for describing and delivering story. We have found finite state machines to work reasonably well, with the storytellers typically using a spreadsheet-type description or a visual tool for creating these machines. We translate these descriptions, either spreadsheet or diagrammatic into XML, which we then import into a Java-based story delivery system using XML binding. Unfortunately, the artist's iterative and elusive creative process becomes grueling and disruptive for the scientist's discrete notion of state. The consequence is that even the simplest story can produce unwieldy numbers of states and transitions that the artist cannot intuitively assess and are rarely precise enough for the computer scientist.

Our research pushes us to dive deeper into practical experimentation of interactive story to find the common denominator between story and procedure. Our initial focus is to better define a relationship between existing story structure within diverse interactive entertainment venues.

### **What to do now?**

Our model is interactive theater whose long history, according to Jeff Wirth, "combines the richness of



**3** Rapid prototype of our model, presented at Siggraph 2003.

rehearsed material, the spontaneity of improvisation, and the empowerment of participation.” While our approach’s roots lie in improvisation, it reaches the complexity and depth of serious drama. However, the recent art and science of simulation is what lets us create the nonlinear “what if” scenarios that explore what we couldn’t, shouldn’t, and wouldn’t do in real life. With the collective techniques of the story forms previously mentioned, it becomes the ideal vehicle for a computer-mediated interactive story. The approach is a matter of looking at simulation more as an expressive media than a visualization tool. It’s just a matter of time and iteration for the creative and scientific maturation for this experiential media to reach new frontiers in interactive digital storytelling. We presented the rapid prototype of our first iteration at Siggraph 2003 (see Figure 3). We will present our next model, Interactive Stories for Mixed Reality for education and training, at the next International Interservice Training

Simulation Educational Conference (IITSEC) in December 2003. ■

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#### Reference

1. C.B. Stapleton, C.E. Hughes, and J.M. Moshell, “Mixed Reality and the Interactive Imagination,” *Proc. 1st Swedish-American Workshop on Modeling and Simulation* (Sawmas 02), 2002.

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