Interaction and Narrative

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Context

"Interaction and Narrative" *is a chapter from Michael's Ph.D. dissertation on Expressive AI (AI-based art and entertainment). A significant portion of the dissertation describes his collaborative work with Andrew Stern on the interactive drama* ***Façade;*** *the purpose of this chapter was to provide a theoretical framework for interactive drama, particularly addressing the problem of agency. The neo-Aristotelian theory described here is Michael's work, the rest is our joint work.*

Player and Character

Games and Narrative

Exploring the intersection between art and artificial intelligence, academic Michael Mateas has forged a new art practice and research discipline called "Expressive AI." He is currently a faculty member at the Georgia Institute of Technology, where he holds a joint appointment in the College of Computing and the School of Literature, Communication and Culture. At Georgia Tech, Michael is the founder of the Experimental Game Lab, whose mission is to push the technological and cultural frontiers of computer-based games.

Andrew Stern is a designer, researcher, writer, and engineer of personality-rich, AI-based interactive characters and stories. With Michael Mateas, he developed the interactive drama *Façade,* a 4-year art/research project, completed in Spring 2005. Previously, Andrew was a lead designer and software engineer at PF.Magic, developing Virtual Babyz, Dogz, and Catz, which sold over 2 million units worldwide. He is now a member of the creative and technical staff of Zoesis, and blogs at www.grandtextauto.org.

Approaches

A number of approaches are currently being pursued in the theorizing and building of interactive narratives. Each of these approaches foregrounds a different aspect of the problem, focusing on a different point within the design space of interactive narrative.

Before continuing, a note about terminology. When speaking generally about interactive story, I will sometimes use the word story and sometimes the word narrative. I use story when talking about experiences that have a tightly organized plot arc, progression towards a climax, beginning, middle and end, etc., that is, experiences such as "mainstream" novels and movies, which are understood as "stories" by the general population. I use *narrative* when talking about the abstract properties or qualities of stories, and more loosely structured, "experimental," story-like experiences.

Commercial Computer Games

The relationship between narrative and game is a hot topic within the computer game design community. The contemporary gaming scene, perhaps driven by the ever-increasing capabilities of computer graphics, and the resulting inexorable drive towards real-time photo-realism, is dominated by mimetic representations of physical scenes, objects and characters. With mimetic representation approaching the richness of animated movies, and with the increasing use of cinematic techniques, such as virtual cameras implementing automated shot vocabularies, comes the desire to provide a narrative explaining who these characters are and why they are in the situation they're in. Contrast this with classic arcade games such as *Pac Man* or *Tempest,* in which the more iconic mode of representation led to games where the proto-narrative was completely dominated by gameplay, and in fact could be safely ignored.

But with this increased interest in narrative, game designers also experience a deep ambivalence. The ephemeral quality of gameplay, the experience of manipulating elements within a responsive, rule-driven world, is still the raison d'être of games, perhaps the primary phenomenological feature that uniquely identifies the computer game as a medium. Where gameplay is all about interactivity, narrative is all about predestination. There is a pervasive feeling in the game design community that narrative and interactivity are antithetical:

> I won't go so far as to say that interactivity and storytelling are mutually exclusive, but I do believe that they exist in an inverse relationship to one another.... Interactivity is almost

> the opposite of narrative; narrative flows under the direction of the author, while interactivity depends on the player for motive power.... [Adams 1999a]

This tension is reflected in the decline of the most story-based game genre, the commercial adventure game. Text adventures were a highly successful form in the 1980s, giving way to the graphic adventures of the early and mid 1990s. And through the mid 1990s, with the release of critically acclaimed titles such as *Myst* and *Grim Fandango,* the adventure game remained a vibrant form. But by the late 1990s the form was in trouble, with reviewers and critics pronouncing the death of the adventure game [Adams 1999b; OMM 2001]. But while early declarations of the death of the adventure game sometimes ended with hope (e.g. "Adventure games appeal to a market which is unimpressed by the size of the explosions or the speed of the engine, a market that for the most part, we're ignoring. But those people want to play games too. It's time to bring adventure games back." [Adams 1999b]), the decline continues to this day, with a recent review in the *New York Times* declaring "So far, 2002 has been the worst year for adventure games since the invention of the computer." [Herold 2002]. While adventure elements continue to live on in action adventures such as *Luigi's Mansion,* the *Resident Evil* franchise, and the *Tomb Raider* franchise, action adventures emphasize physical dexterity (e.g. shooting, running, jumping) over puzzle solving and plot progression.

In contemporary game design, narrative elements are primarily employed to provide an explanatory background against which the high-resolution mimetic action of the game takes place. Thus characters and situations may make reference to well known linear narratives (e.g. *Star Wars*), or nuggets of backstory may be revealed as the game progresses, or the game action may occur within an inexorably progressing narrative. But strongly authored stories whose path and outcome depend on player interaction are not currently an active line of exploration in commercial game design.

Emergent and Player Constructed Narrative

Rather than viewing narratives as highly structured experiences created by an author for consumption by an audience, emergent narrative is concerned with providing a rich framework within which individual players can construct their own narratives, or groups of players can engage in the shared social construction of narratives. Autonomous characters may be designed in such a way that interactions among autonomous characters and between characters and

the player may give rise to loose narratives or narrative snippets [Stern 2002; Stern 1999; Aylett 1999]. Multi-user online worlds, including text-based Multi-User Dungeons (MUDs), avatar spaces, and massively multiplayer games such as *Everquest* and *Ultima Online*, create social spaces in which groups co-construct ongoing narratives. And simulation environments such as *The Sims* may be used by players to construct their own stories. Using the ability to capture screen shots and organize them into photo albums, plus the ability to construct new graphical objects and add them to the game, players of *The Sims* are constructing and posting online thousands of photo album stories.

Narrative and New Media Art

In fine art practice, narrative is understood as one, rather powerful, form of representation. Much of contemporary art practice involves self-consciously questioning representational modes, exploring the boundaries, breaking the representation, questioning whose power is being preserved by a representational mode, and hybridizing modes in order to create new ones. Thus, when engaging in narratively-based work, artists rarely tell straightforward narratives employing the standard narrative tropes available within their culture, but rather ironize, layer, and otherwise subvert the standard tropes from a position of extreme cultural self-consciousness. For example, *Terminal Time* constructs ideologically-biased documentary histories based on audience responses to psychographic profiles. The narrative structure of the traditional documentary form is made visible through endless replication [Domike, Mateas & Vanouse 2002, Mateas, Vanouse & Domike 2000]. *The Dr. K—Project* creates a narrative landscape that, rather than having a mimetic, independent existence, is created in response to audience interaction [Rickman 2002]. In these and similar works, interaction is used to open the narrative, to make its internal structure visible.

A highly active area in new media interactive narrative is net art. Such work, while employing multi-media elements such as sound, still and moving imagery as in Mark Amerika's *Grammatron*, or making use of interaction tropes from classic video games as in Natalie Bookchin's *Intruder*, often makes heavy use of textual presentation and literary effects, and thus is also a form of electronic literature.

Electronic Literature

Electronic literature is concerned with various forms of interactive reading, that is, interactive literary textual narratives. While there is certainly much exploration in this area combining

multi-media elements, kinetic text, and novel interfaces, the canonical forms of electronic literature are hypertext and interactive fiction.

A hypertext consists of a number of interlinked textual nodes, or lexia. The reader navigates these nodes, selecting her own path through the space of lexia, by following links. Links may be dynamic, appearing and disappearing as a function of the interaction history, the contents of nodes may dynamically change, and navigation may make use of spatial mechanisms and metaphors rather than relying purely on link following [Rosenberg 1998]. However, a static node and link structure is the skeleton upon which such effects are added; many hypertext works consist solely of static node and link structures. The production of hypertext literature is intimately connected with the production of hypertext theory. Early theorists saw hypertext as the literal embodiment of postmodernist theories of deferred and intertextual signification [Landow 1992]. Like new media artists, hypertext authors tends to engage in theoretical explorations of the limits of narrative. Interactivity is seen as enabling rhizomatic stories that avoid the authorial imposition of a preferred viewpoint. Every story event can be viewed from multiple points of view, with closure indefinitely deferred.

Interactive fiction is a generalized term for "text adventure," the form inaugurated with the 1976 creation of *Adventure,* a textual simulation of a magical underground world in which the player solves puzzles and searches for treasure. *Adventure,* and all later interactive fictions, makes use of a conversational interface in which the player and the computer exchange text; the player types commands she wishes to perform in the world and the computer responds with descriptions of the world and the results of commands. While text adventures have not been commercially viable since the early 90's, there remains a very active non-commercial interactive fiction scene producing many literary interactive fictions, holding a number of yearly competitions, and actively theorizing the interpretation and production of interactive fiction [Montfort 2003].

Interactive Drama

Interactive drama per se was first conceived in Laurel's 1986 dissertation [Laurel 1986], an extended thought experiment involving dramatic stories in which the player enters as a first-person protagonist. While based most closely on the genres of the text and graphic adventure, interactive drama distinguishes itself from these and other conceptions of interactive narrative in a number of ways.

- Interactive drama takes *drama,* rather than literature, fine art, or game interaction tropes, as the guiding narrative conception. With this focus on drama comes a concern with intensity, enactment, and unity.
- Interactive drama wants player interaction to deeply shape the path and outcome of the story, while maintaining a tight, author given story structure. Thus interactive drama confronts head-on the tension between interactive freedom and story structure.
- Interactive drama seeks first-person immersion as a character *within* the story. *Façade* continues in the tradition of interactive drama.

A Neo-Aristotelian Theory of Interactive Drama

This section describes a neo-Aristotelian theory of interactive drama, continuing a specific thread of discussion first begun by Laurel's adoption of an Aristotelian framework for interactive drama [Laurel 1986], and then more generally for interactive experiences [Laurel 1991], and continued by Murray's description of the experiential pleasures and properties of interactive narratives [Murray 1998]. As an interactive narrative approach, interactive drama foregrounds the tension between interaction and story: how can an interactive experience have the experiential properties of classical, Aristotelian drama (identification, economy, catharsis, closure) while giving the player the interactive freedom to have a real effect on the story? This section provides a theoretical grounding for thinking about this question by developing a theory of interactive drama based on Aristotle's dramatic theory [Aristotle 330BC] but modified to address the interactivity added by player agency. This theory provides both design guidance for maximizing player agency within interactive dramatic experiences (answering the question "What should I build?") and technical direction for the AI work necessary to build the system (answering the question "How should I build it?").

As described above, interactive drama is one approach among many in the space of interactive narrative. The neo-Aristotelian poetics developed here is not intended to be a superiority argument for interactive drama, isolating it as the preferred approach in interactive narrative; rather, this poetics informs a specific niche within the space of interactive narrative and provides a principled way of distinguishing this niche from other interactive narrative experiences.

Defining Interactive Drama

In interactive drama, the player assumes the role of a first person character in a dramatic story. The player does not sit above the story, watching it as in a simulation, but is immersed in the story. Following Laurel, Table 1 lists distinctions between dramatic and literary narratives.

Dramatic narratives	Literary narratives
Enactment	Description
Intensification	Extensification
Unity of Action	Episodic Structure

Table 1. Distinctions between dramatic and literary narratives

Enactment refers to action. Dramas utilize action rather than description to tell a story. Intensification is achieved by arranging incidents so as to intensify emotion and condense time. In contrast, literary forms often "explode" incidents by offering many interpretations of the same incident, examining the incident from multiple perspectives, and expanding time. Unity of action refers to the arrangement of incidents such that they are all causally related to a central action. One central theme organizes all the incidents that occur in the story. Literary narratives tend to employ episodic structure, in which the story consists of a collection of causally unrelated incidents.

Though the model developed in this paper will provide design guidance on how to generate a sense of user agency in any interactive experience, it is primarily designed to illuminate interactive drama, that is, an interactive experience with the properties of dramatic stories.

Though interactive drama is strongly related to interactive fiction, it is interesting to note that a major trope of interactive fiction, the puzzle, is in conflict with the dramatic properties of enactment, intensification, and unity of action. Puzzles disrupt enactment, breaking immersion in the action and forcing reflection on the action as a problem to be solved. As the player thinks about the puzzle, action grinds to a halt. Solving puzzles invariably involves trial-and-error problem solving. All the dead ends involved in solving a puzzle introduce incidents that expand time and reduce emotion, thus disrupting intensification. Each puzzle can be thought of as having a "halo" consisting of all the failed attempts to solve the puzzle. These "halos" are extensive; they expand the experience rather than focus it. Puzzle-based

experiences tend to be episodic; individual puzzles are loosely related by virtue of being in the same world, but are not strongly related to a central action. Puzzles have an internal logic that makes them self sufficient and internally consistent, but disrupts unity of action across the entire experience.

This is not to say that puzzles lack any aesthetic value or are a uniformly "bad" idea in interactive experiences. Montfort convincingly argues that puzzles in interactive fiction are related to the literary figure of the riddle, " ...inviting the riddlee to awaken to a new vision of the world" [Montfort 2003]. It is only to say that the form of engagement demanded by the puzzle is disruptive of dramatic properties.

Murray's Aesthetic Categories

Murray [Murray 1998] proposes three aesthetic categories for the analysis of interactive story experiences: immersion, agency, and transformation.

Immersion is the feeling of being present in another place and engaged in the action therein. Immersion is related to Coleridge's "willing suspension of disbelief"—when a participant is immersed in an experience, they are willing to accept the internal logic of the experience, even though this logic deviates from the logic of the real world. A species of immersion is telepresence, the feeling of being physically present (from a first person point of view) in a remote environment.

Agency is the feeling of empowerment that comes from being able to take actions in the world whose effects relate to the player's intention. This is not mere interface activity. If there are many buttons and knobs for the player to twiddle, but all this twiddling has little effect on the experience, there is no agency. Furthermore, the effect must relate to the player intention. If, in manipulating the interface elements, the player does have an effect on the world, but they are not the effects that the player intended (perhaps the player was randomly trying things because he didn't know what to do, or perhaps the player thought that an action would have one effect, but it instead had another), then there is no agency.

Transformation is the most problematic of Murray's three categories. Transformation has at least three distinct meanings.

- Transformation as masquerade. The game experience allows the player to transform themselves into someone else for the duration of the experience.
- Transformation as variety. The game experience offers a multitude of variations on

a theme. The player is able to exhaustively explore these variations and thus gain an understanding of the theme.

- Personal transformation. The game experience takes the player on a journey of personal transformation.

Transformation as masquerade and variety can be seen as means to effect personal transformation.

Integrating Agency into Aristotle

Murray's categories are phenomenological categories of the interactive story experience, that is, categories describing what it *feels* like to participate in an interactive story. Aristotle's categories (described below) are structural categories for the analysis of drama, that is, categories describing what *parts* a dramatic story is made out of. The trick in developing a theoretical framework for interactive drama is integrating the phenomenological (that is, what it feels like) aspect of a first person experience with the structural aspect of carefully crafted stories. In attempting this integration, I will first discuss the primacy of the category of agency. Second, I will briefly present an interpretation of the Aristotelian categories in terms of material and formal cause. Finally, agency will be integrated into this model.

Primacy of Agency

From an interactive dramatic perspective, agency is the most fundamental of Murray's three categories. Immersion, in the form of engagement, is already implied in the Aristotelian model. Engagement and identification with the protagonist are necessary in order for an audience to experience catharsis. Transformation, in the form of change in the protagonist, also already exists in the Aristotelian model. Murray's discussion of transformation as variety, particularly in the form of the kaleidoscopic narrative that refuses closure, is contrary to the Aristotelian ideals of unity and intensification. To the extent that we want a model of interactive *drama*, as opposed to interactive narrative, much of Murray's discussion of transformation falls outside the scope of such a model. While immersion and transformation exist in some form in non-interactive drama, the audience's sense of having agency within the story is a genuinely new experience enabled by interactivity. For these reasons, agency will be the category integrated with Aristotle.

Aristotelian Drama

Following Laurel [Laurel 1991], Aristotle's theory of drama is represented in *Figure 2.1.*

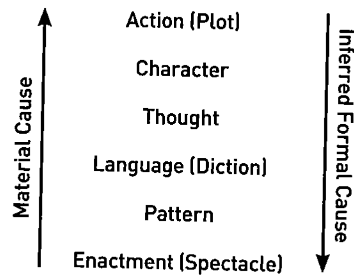

Figure 2.1. Aristotelian theory of drama

Aristotle analyzed plays in terms of six hierarchical categories, corresponding to different "parts" of a play. These categories are related via material cause and formal cause. The material cause of something is the material out of which the thing is created. For example, the material cause of a building is the building materials out of which it is constructed. The formal cause of something is the abstract plan, goal or ideal towards which something is heading. For example, the formal cause of a building is the architectural blueprints.

In drama, the formal cause is the authorial view of the play. The author has constructed a plot that attempts to explicate some theme. The characters required in the play are determined by the plot; the plot is the formal cause of the characters. The characters' thought processes are determined by the kinds of characters they are. The language spoken by the characters is determined by their thought. The patterns (song) present in the play are determined, to a large extent, by the characters' language (more generally, their actions). The spectacle, the sensory display presented to the audience, is determined by the patterns enacted by the characters.

In drama, the material cause is the audience view of the play. The audience experiences a spectacle, a sensory display. In this display, the audience detects patterns. These patterns are understood as character actions (including language). Based on the characters' actions and spoken utterances, the audience infers the characters' thought processes. Based on this understanding of the characters' thought processes, the audience develops an understanding of the characters, the characters' traits and propensities. Based on all this information, the audience understands the plot structure and the theme. In a successful play, the audience is then able to recapitulate the chain of formal causation. When the plot is understood, there should be an "ah-ha" experience in which the audience is now able to

understand how the characters relate to the plot (and why they must be the characters they are), why those type of characters think they way do, why they took the actions they did and said what they did, how their speech and actions created patterns of activity, and how those patterns of activity resulted in the spectacle that the audience saw. By a process of interpretation, the audience works up the chain of material cause in order to recapitulate the chain of formal cause.

Interactive Drama

Adding interaction to the Aristotelian model can be considered the addition of two new causal chains at the level of character as depicted in *Figure 2.2.* The [dashed] arrows are the traditional chains of material and formal causation. The player has been added to the model as a character who can choose his or her own actions. This has the consequence of introducing two new causal chains. The player's intentions become a new source of formal causation. By taking action in the experience, the player's intentions become the formal cause of activity happening at the levels from language down to spectacle. But this ability to take action is not completely free; it is constrained from below by material resources and from above by authorial formal causation from the level of plot.

The elements present below the level of character provide the player with the material resources (material cause) for taking action. The only actions available are the actions supported by the material resources present in the game. The notion of affordance [Norman 1988] from interface design is useful here. In interface design, affordances are the opportunities for action made available by an object or interface. But affordance is even stronger than

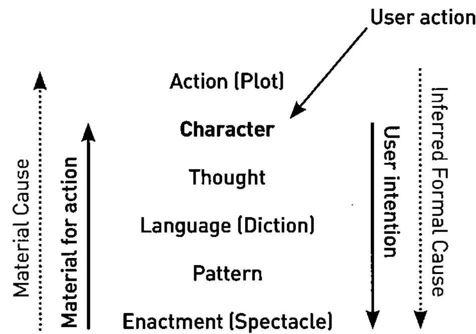

Figure 2.2. Neo-Aristotelian theory of interactive drama

implied by the phrase "made available"; in order for an interface to be said to afford a certain action, the interface must in some sense "cry out" for the action to be taken. There should be a naturalness to the afforded action that makes it the obvious thing to do. For example, the handle on a teapot affords picking up the teapot with your hand. The handle cries out to be grasped. In a similar manner, the material resources in an interactive drama afford action. Thus these resources not only limit what actions can be taken (the negative form of constraint) but cry out to make certain actions obvious (the positive form of constraint). Several examples of the material affordances in interactive drama are provided below.

The characters in an interactive drama should be rich enough that the player can infer a consistent model of the characters' thought. If the characters' thought can be understood (e.g. goals, motivations, desires), then this thought becomes a material resource for player action. By reasoning about the other characters' thoughts, the player can take actions to influence these characters, either to change their thoughts, or actively help or hinder them in their goals and plans.

The dialog (language) spoken by the characters and the opportunities for the player to engage in dialog are another material resource for action. Dialog is a powerful means for characters to express their thoughts, thus instrumental for helping the player to infer a model of the characters' thoughts. Conversely, dialog is a powerful means to influence character behavior. If the experience makes dialog available to the player (and most contemporary interactive experiences do not), this becomes a powerful resource for expressing player intention.

The objects available in the experience (I place the presence of interactive objects somewhere between spectacle and pattern) are yet another material resource for player action.

Finally, the mechanics of interaction (spectacle) provide the low-level resources for player actions. The mechanics provide the interface conventions for taking action.

In addition to the material affordances (constraints) from below, the player experiences formal constraints from above. Of course, these constraints are not directly perceived by the player, but, just as in non-interactive drama, are understood by recapitulating the author's chain of formal causation by making inferences along the chain of material causation. In non-interactive drama, understanding the formal chain of causation allows the audience to appreciate how all the action of the play stems from the dramatic necessity of the plot and theme. In interactive drama, the understanding of the formal causation from the level of plot