Beyond the Screen

Transformations of Literary Structures, Interfaces and Genres
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Beyond the Complex Surface

1 Anticipations of Story

I begin with two unusual encounters. They are unusual in that they were both compelling and disappointing—a strange pairing in itself—and also because both the compelling and disappointing aspects arose, I believe, from the same element of each work: the manner in which each moved “beyond the screen” for its model of presentation and audience interaction.

The first encounter took place in the summer of 2003, at the Ars Electronica Center. I’d been looking forward to interacting with genieBottles—an installation by Ali Mazalek, Alison Wood, and Hiroshi Ishii—for two years, since seeing a tantalizing presentation at SIGGRAPH 2001 (cf. Mazalek, Wood, and Ishii). This project appears as a table with a central translucent surface, lit from below, and three distinctive hand-blown glass bottles (fig. 1). If a bottle is placed on the central surface, the area beneath it glows. If the stopper is removed from a bottle, the genie it “contains” begins to speak, and this becomes a method for audience input into an interactive story experience. As the authors explain:

The genieBottles system presents a story that is told by three genies that live in glass bottles. When a bottle is opened, the genie contained inside is released and begins to talk to the user. If several genies are released at once, they converse with each other. . . . The genieBottles project explores the application of the bottle interface to the field of interactive storytelling. (189)

That summer morning in Linz, I spent a long period opening and closing bottles. At first it was quite engaging. When I opened a bottle, the genie inside would begin to speak in her or his distinctive personality. When I opened another bottle the two genies would acknowledge each other and engage in dialogue. Opening the third led to interactions between all three, and closing any one bottle led to appropriate marking of that genie’s sudden removal from the conversation. It very much created the impression of interacting with characters through magical bottles—which was compelling.
But I had come to the project with an expectation of story, rather than simply speech, and in particular of an interactive story. I expected the things that characters said to have an impact—perhaps on their relationships with each other, or on what they might say later. Or, even if there was nothing dynamic about these characters or their utterances, I expected elements from early interactions to relate meaningfully to later story elements—for the fiction of the unfolding genie conversation to somehow develop. I kept experimenting to see what might produce an experience of the sort I had expected. I tried opening different bottles first. I tried limiting the number that were ever open. I even tried leaving the bottles open for a long time after the experience was apparently over, listening to the ambient sounds that I imagined were the genies going about other business in their living spaces. In part it was the enticing physicality of the installation that kept me experimenting for so long, that made my expectation so strong. In the end, I was never able to elicit what I had expected.

The second encounter took place a little more than five years later, at the Hybrid Ego exhibition of works from the University of Tokyo at the 2008 Ars Electronica Festival. Here I got a chance to spend a longer time interacting with a project I'd previously only seen in crowded venues: *Tablescape Plus*, by Yasuaki Kakehi, Makoto Iida, Takeshi Naemura, and Mitsunori Matsushita (fig. 2). The Ars Electronica program describes the work this way:

*Fig. 1. genieBottle*, by Ali Mazalek, Alison Wood, and Hiroshi Ishii.

*Fig. 2. Tablescape Plus*, by Yasuaki Kakehi, Makoto Iida, Takeshi Naemura, and Mitsunori Matsushita.

Tblescape Plus is an interactive tabletop video theater. Different images are projected onto the respective tiny screens placed upright on the table. As the user moves the screens, the images change. Moreover, users can develop new stories by changing the arrangement of the screens.

To describe it more fully, *Tablescape Plus* projects a pastoral scene onto a table—grass, trees, a bench, and a group of people. While the grass appears on the surface of the table, elements such as the bench and trees stand individually upright on the surface, though still showing projected (rather than static) images. The people are also projected in this manner, and interaction with the system consists of moving the small stands onto which the people are projected, which triggers animated behavior based on proximities. A person placed next to the bench will sit on it. A person placed next to another person will engage in mutual greeting. If people are placed on both ends of the bench they will both sit and interact.

My previous hands-on experience with *Tablescape Plus* had been at the crowded Emerging Technologies exhibition of SIGGRAPH 2007. But there I had taken it as a demonstration of projection technology. Reading the Ars Electronica program I was excited to see that "users can develop new stories" with *Tablescape Plus*, and I made it a priority to visit the Hybrid Ego exhibition.
to experiment further. As luck (and jetlag) would have it, I arrived at a time when I had the installation largely to myself for an extended period.

Looking more closely at the people, I saw a group of identifiable character types, with a young woman and young man seeming likely to have the makings of an interesting storyline. Perhaps the man in the suit was the father of one of them? Or perhaps a potential romantic rival? I sat the young man on the bench, the woman next to him, and they greeted each other. Then they kept greeting each other. I moved the young man and replaced him with the older man. He and the young woman greeted each other. I tried putting the young man next to them and nothing changed. I put the young woman next to the young man and they greeted each other in a standing position. I kept at the experiment until other people filtered in, wanting their turn at Tablescape Plus, and I observed them make pairs of characters greet each other for a while before moving on.

While this initially-compelling moment, followed by disappointment, has parallels with my experience of genieBottles, my goal is not to flesh out the similarities between the two. Rather, it is to treat them as emblematic of the disappointments we often experience with digital media that engage with literary forms—particularly “story”—and employ what might be called complex surfaces. My argument is that, using common current approaches (which represent characters in fictional space/time, represent the complex surface as a means of manipulating these characters, and employ relatively simple underlying processes) such disappointments are nearly inevitable. The root problem is not that identified by Brian Kim Stefans in discussing another set of installation-oriented works of digital literature, a failure to “privilege language,” though a work such as Tablescape Plus goes as far as one can in this direction (containing neither legible nor audible language). Rather, the problem lies in the relations produced by such works between audience expectation and surface, process, and data.

In the coming pages I will look more closely at elements of these two works in order to explain my position. First, however, it is important to situate this discussion. In the next section I will outline what I mean by “complex surfaces”—and in the following section I will introduce the screen-derived framework I use for discussing digital media. This framework both serves as a foundation for and is somewhat troubled by this chapter's examination of literary works with complex surfaces.

2 Complex Surfaces

I borrow my terminology from a discussion of “writing on complex surfaces” by John Cayley, but do so quite inexacty. While, like Cayley, I am looking for a way of thinking beyond the screen, and seek a category that includes both digital and non-digital work, Cayley is focused specifically on textual objects, those that aren’t in the category of “flatland texts on paper-thin surfaces.” In this chapter I expand the notion of literary works with complex surfaces to include works with no legible texts, and no letterforms, including all attempts to engage with literary forms. This includes auditory language (as found in genieBottles) and non-linguistic forms (as in the gesture toward animated fiction/drama attempted by Tablescape Plus).

Making the move toward emphasizing complex surfaces can change how we see past work. For example, Judy Malloy’s card catalog fictions (fig. 3), which have long been discussed as precursors to random-access digital fictions, in today’s light may appear with much more emphasis on their specific embodiment. In this way they may seem precursors to work such as genieBottles—repurposing familiar objects as the interface to a fictional structure.

Fig. 3. Judy Malloy’s artists books (1978–1980) installed at the Berkeley Art Center, 1980.

In addition to directly repurposing known objects, literary work with complex surfaces may also overlay known spaces. For example, Teri Rueb’s Itinerant invites people to take a walk through Boston Common and surrounding neighborhoods to experience an interactive sound work (a personal narrative
of family and displacement, interspersed with passages from Mary Shelley’s *Frankenstein*, delivered via handheld computer and driven by GPS satellite information. I would probably also refer to work that overlays existing virtual spaces as having a complex surface—and some projects do both. For example, The Beast is the unofficial name of the first successful alternate reality game, a murder mystery which never had an official name or web site. It involved writing and work in other media distributed across the Web on thirty sites; on other Internet services; via phone, fax, USPS, bathroom walls, and live events; as well as on television.

Works with complex surfaces also revisit our most familiar literary surface: the codex book. One of the most famous pre-digital examples is Raymond Queneau’s *Cent mille millions de poèmes* (#One Hundred Thousand Billion Poems). This work consists of ten sonnets, each of fourteen lines. A reader can construct alternate poems by reading the first line of any of the original sonnets, followed by the second line of any sonnet, followed by the third line of any sonnet—and find that the whole work is artfully constructed so that any reading of this sort produces a sonnet that functions syntactically, metrically, and in its rhyme scheme. This exploration is enabled by the complex surface on which the work is printed, with each original poem on a page cut into fourteen strips that can be turned individually. Such reimaginings of the book continue in digital work, such as Mark Billinghurst et al.’s MagiBook, which uses augmented reality technology to add three-dimensional images to paper books.

A catalog of approaches could consume the rest of this chapter, so let me conclude this section by noting that I have been involved in presenting and creating work of this sort. For example, I was an organizer of the *Grand Text Auto* exhibition at the University of California, Irvine’s Beall Center for Art and Technology in 2007. There we constructed an installation the size of a studio apartment, with one wall made of scrim through which an outside audience could see and hear. Inside we installed an augmented reality version of Michael Mateas and Andrew Stern’s interactive drama *Facade*. This version, created by Steven Dow, Manish Mehta, Annie Lusier, Ellie Harmon, and Blair MacIntyre in collaboration with the authors of *Facade*, superimposed the drama’s animated characters onto the physical space of the apartment, allowing audiences to interact through spoken language, physical gesture, and employing the physical props present in the space.

My own work in this area includes *Talking Cure*, an installation and performance piece created in collaboration with Camille Utterback, Chilly Castiglia, and Nathan Wardrip-Fruin. Both the installation and performance versions employ video processing so that the moving image of an audience member or performer is composed of three colored layers of text. The installation version also includes a dynamically composed sound environment that incor-

porates elements of language spoken by installation visitors—as well as textual replacement of one of the image’s layers with speech-to-text approximations of words spoken by audience members. Finally, closest to Cayley’s discussion of three-dimensional text in the fourth section of his essay, and his chapter for this volume, I also collaborated with a group to create the VR Cave piece *Screen*—the group included Josh Carroll, Robert Coover, Shawn Greenlee, Andrew McClain, and Ben “Sascha” Shine. This piece at first defies VR conventions by projecting text on the Cave’s walls as though it is a simple, flat projection surface. In time, words begin to peel loose from the walls and fly around the reader, who can knock them back (or apart) with her hand.

As this listing hopefully makes clear, while literary work for complex surfaces is often presented as peripheral—either to literature on paper or on the screen—it encompasses the intersection of literature with book art, installation art, net art, locative media, virtual and augmented reality, and much more. If it smacks of hubris to make generalizations about paper literature, then, how much moreso if we seek to generalize about this vast artistic space? And yet I think there is a productive generalization to make—the very one that inspires the phrase and the category. These works often turn our attention to their surfaces, creating powerful audience anticipation and expectation of novelty through them. This is in contrast to the codex book, with which we generally experience audience expectations that run in the opposite direction from novelty, and even in contrast to the increasingly routinized forms of presentation and interaction found in screen-based digital media. It also places productive pressure on frameworks for understanding our field that take screens and their standard computational/interface configurations (e.g., game console, laptop) as a given.

3 A Screen-Derived Framework

In *Expressive Processing* I present a framework for thinking about the elements of digital media that was developed with just the sort of focus on standard, screen-oriented configurations mentioned in the section above. The starting point for this framework’s account of authoring digital media is the crafting and selecting of data and process, with a somewhat fuzzy line between them (fig. 4). The data elements are mostly precreated media (text, still images, video and animation, and sound and music) and the sorts of things that are stored in spreadsheets (lists and tables of information, with varying degrees of structure). The processes, on the other hand, are the working parts of the project’s software machine. Some are dedicated to tasks with simple structures, such as displaying a series of video images on a screen. But many of digital media’s
tasks are more complex in structure, requiring processes capable of performing in a range of different ways. Even a simple piece of digital media such as Peng has processes that define behaviors much more complex—calculating simple rules of physics (how the ball bounces off the paddles and walls) as well as simple game rules (who receives each serve, how points are scored, and how winning is achieved) that, when well tuned, can combine to create a compelling experience of gameplay—even in the face of remarkably primitive graphics.

Fig. 4. In *Expressive Processing*’s model of digital media, authors craft and select each work’s data and process.

Rather than introduce the surface of the work as a major site of authoring (as it clearly is for works mentioned in the section above) instead the account in *Expressive Processing* introduces the surface as an element interposed between the audience’s view of the work and the author’s focus on data and processes. More specifically, it characterizes the surface as “what the audience experiences”: the output of the processes operating on the data, in the context of the physical hardware and setting, through which any audience interaction takes place (fig. 5). While interaction is certainly a contested term, I define it as a change to the state of the work—for which the work is designed—that comes from outside the work. Interaction takes place through the surface of the work, resulting in change to its internal data and/or processes. In many cases, some trace of interaction is immediately apparent on the surface (e.g., an audience member types and the letters appear as they are typed, or an audience member moves her hand and a video image of her hand moves simultaneously), but this is not required.

Fig. 5. The surface is what the audience experiences directly, through which any audience interaction with the underlying processes and data takes place.

While it is still possible to use a framework such as this to discuss works with complex surfaces, it is clear that the discussion must also consider certain shortcomings. For example, while *AR Façade* clearly has a surface, processes, and data, it doesn’t make sense to focus solely on the fact that interaction with the surface results in changes to the underlying data and processes. Picking up one of *AR Façade*’s physical props—part of its surface—also obviously results in a change to the physical configuration of its complex surface in a manner that is only partially captured by any tacking of its location in the system’s data. Perhaps more subtly, the underlying *genieBottles* system does not control the exact placement and rotation of the bottles on the table. Each new audience finds them in the positions in which the last audience left them, and then positions them again through use. Nevertheless, given it is an installation project with a sculptural presence, these elements are clearly important parts of how each audience experiences the work. While we might say they are left to an “aleatory process,” this is not a process enacted through digital computation, but rather embedded in the structure of how the audience encounters the work’s complex surface. Less subtly, the creation of the table and bottles (the complex surface) was clearly one of the significant sites of artistic/authorial work on the project—which, as noted above, is also an important fact about a number of the works discussed in this chapter’s section giving examples of complex surfaces.

This demonstrates some ways that considering works with complex surfaces places productive pressure on frameworks derived largely from examina-
tion of screen-based works. I will consider another important aspect of this below. However, at the same time, I believe the same elements identified in this framework can help us understand the challenges faced by works with complex surfaces. In the next section I will use the terms of this framework to explain why my disappointment with genieBottles and Tablescape Plus was nearly inevitable.

4 What is Behind the Complex Surface?

One function of the bottles in genieBottles is to fix an interaction vocabulary. The only significant act is unstopping or stopping a bottle—adding or removing an active genie—for one of three bottles. This seems a pretty limited vocabulary.

But consider its implications. First, there are seven possible open states for the bottles: three for each bottle being open on its own, three for each of the possible pairs, and one in which all three are open (plus an all-closed state in which no genie speaks). Second, because opening or closing a bottle represents a character joining or leaving the conversation, it must be possible to dynamically alter the number of characters speaking at any time. In short, the interaction model defined by the surface, together with the manner in which it is mapped onto the fictional structure, creates an authoring challenge.

Mazalek describes her response to this challenge as “a state-transition model for interactive storytelling” (57-60). The process operates this way. Each of the seven possible open states (e.g., a particular pair of genies) has a set of story segments. When the system is in a particular state it plays the next segment for that state which has not previously been played (for the current audience). When the system changes state it randomly selects from transition lines that mark the interruption or departure of a genie (if appropriate) and then plays the next unplayed segment from the new state.

This design has a number of virtues. The moment-to-moment interactions of the genies can be hand-scripted...and therefore guaranteed to be revealing and coherent. The system behavior is simple and consistent...and therefore easy to debug. There is no lag between interaction and conversational acknowledgement...so the audience never wonders if the interface is working.

But, from a writer’s perspective—crafting the data for genieBottles—the system presents a herculean, perhaps impossible task. Even for a short audience experience, the writer must produce a large number of lines, because most audiences will not visit all seven possible states and may leave any one state active for a long period. More significantly, because each state only tracks what has happened previously in its progression, nothing can happen in any part of the conversation that is of great fictional consequence—because, while genieBottles presents itself as an ongoing conversation, the fact that any event/segment has occurred can have no influence on those in any other state.

Mazalek is aware of the fact that genieBottles conversations lack a sense of fictional consequence and progression. But she attributes this to a lack of material: “In Alison’s genie story, there are only two short segments of story text for each state. A longer story with a stronger narrative progression might require a dozen or more segments of story text for each state.”

Actually, it would require a different set of processes, or a different mapping between the processes and the fictional world (e.g., onto something other than a linear conversation). Even with its small number of segments, genieBottles frequently presents material in orders that work against what narrative progression it has. For example, the segments for single-genie states tend to introduce the character and background situation, while the segments for the three-genie state are the closest genieBot has to a narrative climax. But because audiences often don’t close bottles in the same order in which they were opened, a single-genie state is often the last one visited, so that many genieBottles stories end with introductions for characters that have already been revealed through other interactions. Adding more story segments to the current design would simply increase the chance of such outcomes, because it would be less likely to exhaust each state’s material before moving on to the next.

More broadly, the state-transition model of narrative places an onerous burden on writers that is also a familiar one in digital media: trying to imagine, and produce appropriate data for, a combinatorial explosion of possible interaction paths through a state space—with little, or no, support from the larger system. It perhaps goes without saying that this is also the case for those producing the animation data for Tablescape Plus. Each of the four characters has the state they are in when alone (four states), the pairs they can be in with other characters directly (six states), their states for being on the bench and in the woods (eight more), and the states for sharing the bench with specific characters (six more). The processes of the underlying system don’t give the appearance of even tracking history within a particular state (e.g., whether it has happened before, how long it has been going on). Given this, it seems impossible to imagine authoring data that would carry through on the promise of letting audiences produce stories through interaction. Rather, the data consists of animations of the characters standing in place and greeting each other—which is probably the only sensible choice. Audience-driven character interactions require some underlying support for history or consequence to convincingly produce stories.

A potential objection to this diagnosis, however, is that the most obvious approaches to representing history in a system tend to make the problem
worse. Hand-authoring all the possible paths, even for an interface as limited as that of genieBottles, quickly takes one toward the massive story-maze described (but, crucially, not produced) in Borges's garden of forking paths. To make projects that actually function in the manner that genieBottles and Tablescape Plus can only tantalizingly suggest, innovation at the surface must be wedded with innovation in processes, shaping a system that allows writers and artists to produce the necessary data tractably and deliver it powerfully.

5 Process Intensity

While unusual in the discussion of literary works with complex surfaces, the conclusion of the previous section points toward a familiar argument in digital media circles—one articulated most famously by game designer and digital media theorist Chris Crawford more than two decades ago. In an influential article, Crawford coined the phrase "process intensity" to describe a work's balance between process and data (what he called its "crunch per bits ratio"). Crawford points out that in the early years of home computing certain genres of software failed despite a widespread belief that they would be attractive—specifically, he cites checkbook-balancing and kitchen-recipe software. He argues that these genres failed for the same reason that the 1960s computer game hit Dragon's Lair (which played sequences of canned animation, instead of dynamically drawing graphics to the screen) was a dead end, rather than the first example of a new genre. In all these cases, the software is designed with low process intensity. In fact, Crawford goes so far as to assert that process intensity "provides us with a useful criterion for evaluating the value of any piece of software."

I believe that Crawford's notion remains valuable today, but like other ideas I have presented here it requires some adjustment for the kinds of surfaces discussed in this volume. For example, a VR display can use quite a bit of processing power simply in order to show static data files to an audience—given that the audience changes perspective with even small head movements, requiring regular recalculation of stereo-separated viewpoints on the 3D scene. I believe that Crawford's notion is more useful to us, now, if we think of it as pointing toward the amount of processing that is used to produce dynamic system behavior (the focus of the processing examples in his article).

If we think of process intensity in this way, it presents an alternative to the seemingly-intractable authoring dilemmas presented by surfaces such as those employed by genieBottles and Tablescape Plus. Rather than authoring a large body of data, each piece of which is tied to pre-determined states, the author creates a combination of data and behavior rules. The rules specify how data is selected, combined, and perhaps altered based not only on the current state but on aspects of what has gone before. One can imagine a Tablescape Plus connected to a body of plot fragments such as those defined in the Universe model of story generation for ongoing fictional worlds (Lebowitz). One can imagine genieBottles connected to models of developing character emotional states, informing reactive planning of behavior, as found in systems from the Oz Project (Bates, Loyall, and Reilly). And there are many other potentially successful possibilities one could imagine, but all require a much greater degree of process intensity than is commonly found in literary works with complex surfaces.

Or do they? The selection of examples earlier in this chapter would seem to contradict the above assertion. The levels of "process intensity" in Mallory's card catalog fictions and Queneau's One Hundred Thousand Billion Poems both seem rather low. How can these projects be successful if process intensity is necessary for such works to accomplish what their surfaces promise?

I believe there are two key facts that help explain the seeming contradiction. First, both Malloy's and Queneau's works present paper as the object of manipulation, so it is appropriate for the objects to behave like paper. Tablescape Plus and genieBottles, on the other hand, present characters as the objects of manipulation, so it is important that they act like characters. Greater process intensity provides a possible route to this. Second, Mallory's and Queneau's works seem crafted with an understanding that what they are attempting—writing fixed data for wide recombination that results in a satisfying audience experience—is a very difficult task. In fact, as given as a writer as Queneau found his work on One Hundred Thousand Billion Poems so difficult that he doubted he could complete the project (Lescure 32). Greater process intensity provides an alternative to asking of every writer for complex surfaces that they take on a task of the sort that nearly defeated one of the 20th century's great experimental writers.

Given this, I believe we need to think carefully about the kinds of processes that can respond to a wide variety of states and histories. We need to think about connections between process authoring and audience experience. And we need to connect these to what has already been observed about literary works with complex surfaces. The first two of these are a major focus of Expressive Processing, but again as guided by a focus on screen-based work. In the next three sections I will outline the three major "effects" that I consider important to understanding these issues—after which I will discuss how these ideas must be considered again when the focus shifts to works with complex surfaces.
6 The Eliza Effect

In *Hamlet on the Holodeck* Janet Murray argues that Joseph "Weizenbaum stands as the earliest, and still perhaps the premier, literary artist in the computer medium because he so successfully applied procedural thinking to the behavior of a psychotherapist in a clinical interview" (72). Murray is referring, of course, to Weizenbaum's mid-1960s Eliza program for natural-language conversation and its most famous script, *Doctor*. This system remains one of the most widely referenced (and widely taught) examples of digital literature, and human-computer interaction more generally.

Eliza's actual operations are a simple set of keyword-based transformations—providing one example of how processes can respond to a wide variety of states or inputs. Each statement from *Eliza* is a rule-driven transformation or reflection of the audience member's previous statement. Yet the Eliza effect results in what seems, at first blush, like an actual conversation. As Murray points out, this works particularly well with Weizenbaum's *Doctor* script, which parodies the conversational patterns of a Rogerian therapist during an initial visit.

Why was this so effective? First, *Eliza*/*Doctor's* original audiences were accustomed to text-only computing and to having conversations with other people within that environment. Second, as Murray suggests, *Eliza*/*Doctor* makes a remarkably good match between process and data. The situation of the initial visit to the therapist, the clever writing in the transformations and non-responses, and the well-chosen keywords do the most possible to leverage the simple linguistic tricks available via *Eliza*’s processes. Third, for many audience members this was one of their first experiences with computer characters. But all three of these reasons are only *Eliza*/*Doctor*’s specific nuances on a much more general phenomenon: When a system is presented as intelligent, and appears to exhibit intelligent behavior, people have a remarkably strong tendency to regard it as such. (This fact has artistic implications, of course, but also political ones.)

Over the decade following his first publication about the system, Weizenbaum’s focus increasingly turned to the disturbing aspects of the Eliza effect, resulting in the publication of *Computer Power and Human Reason*. Lucy Suchman, writing a decade later, instead approached the Eliza effect as an illustration of how much work our expectation does in human-computer interaction, as it does in all interaction. In *Plans and Situated Actions* she discusses what ethnomethodologist Harold Garfinkel (citing Karl Mannheim) has called the “documentary method of interpretation.” Suchman presents one of Garfinkel's experiments as a demonstration of the idea that people tend to "take appearances as evidence for, or the document of, an ascribed underlying reality, while taking the reality so ascribed as a resource for the interpretation of the appearance" (23). In this experiment student subjects were introduced to a new kind of therapy in which they asked yes/no questions about their personal problems. These were answered by counselors who were not visible to the subjects. Unbeknownst to the subjects, the “counselors” answered each question randomly. After the experiment, the students were found to have constructed stories that made sense of each string of answers as a coherent exchange and set of advice. This happened even when, as would almost inevitably happen in such a circumstance, the answers given were self-contradictory. This is a powerful example of the Eliza effect. But it is also a good illustration of its limitations. If even a minimally larger space for interaction were available—say, the range of responses of a “magic 8-ball”—the illusion would have been shattered.

This is why I disagree with Murray's analysis (published a decade after Suchman’s). While the power of expectation is such that the Eliza effect can be initially successful, without highly constrained interaction the result of playful interaction with such systems is breakdown—which takes a form based on the structure of the underlying system. As we begin to understand its shape, interactions with the *Eliza* system start to look like this:

You are going to repeat what I say in the form of a question

**WHAT MAKES YOU THINK I AM GOING TO REPEAT WHAT YOU SAY IN THE FORM OF A QUESTION**

While neither *genderbattles nor Tablescape Plus* creates a dynamic range of responses during interaction, in terms of audience relationship to process, both can be seen as operating in a vein similar to Eliza’s. Both create an initial illusion of characters who behave appropriately during initial interaction—whether acknowledging new additions to a spoken conversation or acknowledging through animation the character who sits down on the same park bench. Both also break down during sustained interaction in a manner that reflects their underlying system shape. The question, then, is what alternative strategies exist. I believe that, rather than seek to build on the temporary success of the Eliza effect, hiding limited systems from our audiences for whatever time we can, our task should be to craft processes that contribute to the meaning of our works.
7 The Tale-Spin Effect

Like Eliza, Tale-Spin is a landmark of digital media. Created by James Meehan in 1976, Tale-Spin is the first major story generation program. It made the leap from assembling stories out of pre-defined bits (like the pages of a Choose Your Own Adventure book) to generating stories via carefully-crafted processes that operate at a fine level on story data. In Tale-Spin’s case, the processes simulate character reasoning and behavior (expressing a set of artificially intelligence ideas then current at Yale) while the data defines a virtual world inhabited by the characters. As a result, while altering one page of a Choose Your Own Adventure leaves most of its story material unchanged, altering one behavior rule or fact about the world can lead to wildly different Tale-Spin fictions.

Because it is precisely a system for creating a wide variety of character behavior over time, structured by rules that embody an authorial viewpoint on how characters should behave, Tale-Spin seems like a promising system for thinking through the dilemmas presented by genieBots and Tablescape Plus. On the other hand, Tale-Spin was imagined as a story generator, rather than an interactive story system, so it is only designed to accept audience input of story world facts needed for generation, rather than ongoing interaction with story characters. Audiences can define facts such as which characters are in the world, what other objects are present, who is the protagonist, and the nature of the protagonist’s guiding problem (a choice between the decidedly physical problems of being hungry, tired, thirsty, or horny).

When the audience makes its choices, Tale-Spin doesn’t simply record these facts about the world. In addition, internal Tale-Spin mechanisms draw “inferences” from the facts. For example, if it is asserted that a character is thirsty, then the inference mechanisms result in the character knowing she is thirsty, forming the goal of not being thirsty, forming a plan for reaching her goal, and so on.

Some uses of inferences are relatively straightforward. It’s no surprise that a thirsty character will form a plan for not being thirsty. But other uses of Tale-Spin’s inference mechanisms can be quite surprising. For example, Tale-Spin characters can use its inference mechanisms to “speculate” about the results of different courses of action. Meehan’s The Metanovel describes a story involving such speculation, in which a hungry Arthur Bear asks George Bird to tell him the location of some honey. We learn that George believes that Arthur trusts him, and that Arthur will believe whatever he says. So George begins to use the Tale-Spin inference mechanisms to “imagine” other possible worlds in which Arthur believes there is honey somewhere. George draws four inferences from this, and then he follows the inferences from each of those inferences, but he doesn’t find what he’s after. In none of the possible worlds about which he’s speculated is he any happier or less happy than he is now. Seeing no advantage in the situation for himself, he decides, based on his fundamental personality, to answer. Specifically, he decides to lie.

This is a relatively complex piece of psychological action, and certainly tells us something about George as a character. But the surface appearance of a Tale-Spin story never contains any information about this kind of action. For example, here is a quote provided by Meehan from a similar moment in a Tale-Spin story: “Tom asked Wilma whether Wilma would tell Tom where there were some berries if Tom gave Wilma a worm. Wilma was inclined to lie to Tom” (232). As we know from the tale of Arthur and George, a complex set of speculations and character-driven decisions took place as Wilma considered Tom’s request. But all that—probably one of the most interesting parts of this story, as it is simulated inside Tale-Spin—is lost in the gap between the above two sentences.

No matter how creatively one plays with Tale-Spin, such hidden action cannot be deduced from its surface outputs. This is probably why, though Tale-Spin is seen as a landmark in computer science circles, it is often treated with near-ridicule in literary circles. Critics as astute as Janet Murray, Espen Aarseth, and Jay David Bolter have ignored what makes Tale-Spin interesting, focusing instead on what its output looks like on the surface.

Of course, while we can call this an oversight of these critics, it is probably more accurate to describe this as a failure of Tale-Spin itself. While Tale-Spin’s author created complex and interesting internal processes, he failed to make that apparent at the surface level. While playing with Tale-Spin actually involves seeing an intricate world in motion, the audience experience is blunt and repetitive.

This situation is far from uncommon in digital media, perhaps particularly in the digital arts, where fascinating processes—drawing on inspirations ranging from John Cage to the cutting edge of computer science—are often encased in an opaque interface. In fact, this effect is at least as common as the Eliza effect, though I know of no term that describes it. Given this, I have proposed “the Tale-Spin effect” as a term for works that appear, at their interface, significantly less complex than they are internally.

The Tale-Spin effect, like the Eliza effect, is not only a description of audience experience—it is also a warning to authors of digital media. Just as play will unmask a simple process with more complex pretensions, so play with a fascinating system will lack all fascination if the system’s operations are too-well hidden from the audience. In other words, a version of genieBots or Tablescape Plus with complex simulation processes driving surface behavior would not necessarily be more successful. The ways in which these processes operate,
and their relationship to the larger conception of the piece, would have to contribute to the audience experience meaningfully.

8 The SimCity Effect

In the mid-1980s, Will Wright created a landscape editor for authoring his first game, an attack helicopter simulation. Working with the editor, he had a realization: “I was having more fun making the places than I was blowing them up” (“Will Wright Chat Transcript”). From this the idea for Wright’s genre-defining SimCity was born.

Wright realized that interacting with his terrain editor was more interesting than interacting with its outputs. In a way this is quite similar to the insight offered by the T-shirt Spin effect: let the audience play with the most interesting parts of the system.

SimCity, of course, unlike a terrain editor, doesn’t simply wait for a user to do something. Time begins passing the moment a new city is founded. A status bar tells the player what’s needed next—starting with basic needs like a residential zone and a power plant and, if play succeeds for any period, ramping up to railroads, police stations, stadiums, and so on. A budding city planner can lay out spaces, but it’s up to the city’s virtual inhabitants to occupy them, build and rebuild, and pay the taxes that allow the city to continue to grow.

As cities grow, areas respond differently. Some may be bustling while others empty out, or never attract much interest at all. SimCity provides different map views that can help diagnose problems with abandoned areas. Is it too much pollution? Too much crime? Too much traffic? Players can try changing existing areas of the city (e.g., building additional roads) or create new areas with different characteristics. Observation and comparison offer insights. Why is this commercial area fully developed, while that one lies fallow? The answer is always found by trying something different and considering the results.

In other words, the process of play with SimCity is one of learning to understand the system’s operations. Conversely, the challenge of game design is to create a surface-level experience that will make it possible for audiences to build up an appropriate model of the system internals. As Wright puts it:

As a player, a lot of what you’re trying to do is reverse engineer the simulation. . . . The more accurately you can model that simulation in your head, the better your strategies are going to be going forward. So what we’re trying to [do] as designers is build up these mental models in the player. (Interview)

In some ways this might sound like the opposite of the Eivag effect, but there is an important similarity at the outset. As Wright observes, a system like SimCity is an elaborate simulation with thousands of variables. The designer can’t simply expose the system directly and immediately, hoping the audience will grasp it. Instead, Wright and his colleagues ask, “What’s the simplest mental model that you can walk up to one of these games [with] and start playing it, and at least understand the basics?” It might be the wrong model, but it’s the starting point for a learning process, prompted by the game itself.

In other words, like the Eivag effect, the SimCity effect begins with expectation. Playing SimCity begins with the audience’s expectations of city planning, city composition, and the meaning of its various components. Then, through experimentation and play, the system is designed to transition audiences from their initial expectations to an increasingly developed understanding of how SimCity’s actual system works. In other words, through interaction audiences come to understand the kind of representation of a city one finds in SimCity. This is in stark contrast to the audience experience of Eivag, which only functions as a representation of therapy—or conversation—until audience interaction leads to breakdown.

Further, it’s worth noting that SimCity doesn’t help players work out the operations of its system in order to enable some other sort of play. For example, one doesn’t interact with a SimCity city in order to produce resources that will be used to build armies to employ in strategic war gameplay or to solve puzzles that require cities of particular makeups. Rather, one comes to understand the city—and its complex systems remain the focus of gameplay, inviting creative engagement with its systems (and the formation of audience-defined goals, given there is no “winning” state).

In the creation of digital literature that engages process deeply, we may have something to learn from both aspects. The SimCity effect illustrates how we can create works that transition audiences from their initial expectations to an understanding of the processes we have crafted as part of the expression of the piece. It may be that—as we use such techniques to follow through on promises such as Tabletop Plus’s that “users can develop new stories”—the most effective authoring approaches may be those that encourage audiences to experiment with the systems’ potentials, rather than work toward author-defined goals.
9 Resurfacing

The *Elegy* and *SimCity* effects point to the importance of *expectation* in understanding audience relationships with digital media. But because these concepts were developed with an orientation toward standard configurations, the importance of surface objects themselves (rather than how they enable display and interaction) is not foregrounded in the account of expectation. More generally, it is important to consider how these concepts must be expanded or reconsidered when works of digital literature with complex surfaces are placed at the center of our discussion—and how this relates to the present moment in our field.

As authors select and craft complex surfaces for their works, expectations can be created more flexibly and perhaps more powerfully than when working with default configurations (whether personal computer screens or codex books). For example, Quenecau’s surface sets expectations much more clearly in paper form than in the many later screen-based adaptations. In fact, it is not only clear that each of the fourteen rows of strips (each holding a sonnet line) has a defined set of ten possible options, among which the audience can choose for any reading—further, the process itself is embedded in the design of the surface, which enables these possibilities (and not others) through its physical properties.

At the same time, it is certainly not necessary that complex surfaces make the interaction and process possibilities of their works apparent. For example, while the design of the surface of *Genie Bottles* similarly makes clear the possible space of interaction (stopping or unstopping the three bottles) the surface of *Tablescape Plus* does not. The *Tablescape Plus* surface may suggest putting things next to each other, but it does not make clear that this works for two objects in almost all cases, three objects in fewer cases (e.g., two people on each side of the bench), and four in no cases. The complex surface is an opportunity for setting expectations—and for shaping interaction patterns—but it is an opportunity that will be taken up in varying manners and to various extents.

This sits alongside another opportunity: using innovations at the surface level to renew forms. Recall that this chapter’s model of digital media focuses on data, process, and surface. In general, most authoring of digital literature has focused on data—primarily text, image, and sound—while employing a small vocabulary of processes and surfaces. This has led to wide exploration of works for personal computers that employ a set of processes that are in danger of becoming clichéd. These include processes for unconstrained randomness, simple link-based trails of association (and their cousin, Storyspace links with guard fields), and simple spatial organizations.

I believe we are in a period during which experimentation is one of our most important activities. We are trying to create compelling literary experiences, but we are also still early in exploring the landscape of the possible in digital literature. While one obvious way to pursue this is to move beyond our process clichés and into the exploration of processes specific to new works (much as we generally create text specific to each work) there are also compelling possibilities in looking “beyond the screen.” This is what I mean by complex surfaces offering the opportunity to renew forms. For example, Rueb’s *Itinerant* offers an audience experience that is largely along the lines of the process cliché of simple 2D spatial organization of fixed text chunks (as found in Storyspace map views, web imagemap, and rollover Flash pieces). But by layering this data, and this experience, over the physical space of Boston Common—and moving exploration from mouse clicks to physically roaming the neighborhood—Rueb performs an experiment within an emerging literary possibility space.

I hope something similar can be said in favor of my collaborative project *Screen*. While Cave-form virtual reality has a significant history as a surface for digital media, and simple collision detection (which we employ to allow the reader/player to strike words with her hand) is perhaps the most clichéd operational logic in computer games (stretching back to *Pong* and *Spacewar*), combining the two for literary purposes may result in an interesting experiment in new literary possibilities. Specifically, it engages the audience’s body with typographic language in a way that other uses of the same surface and process had not.

Returning to *Itinerant*, from a process-oriented view its complex surface renews the form of simple 2D spatial organization. Of course, from a surface-oriented perspective it instead is one of a number of explorations of locative media fiction—which could be connected to a wide variety of processes. Neither viewpoint is inappropriate.

While I value the exploration of new territories, I don’t think the primary lesson of our present moment is that every author of digital literature must become adept at the crafting of new computational processes—or at the many approaches that can result in new surface explorations (from robotics through book arts). Rather, I hope that we can move into a period in which we stop taking a small vocabulary of processes and surfaces as given, and instead think of the tasks of authoring as including the selection and crafting of data, process, and surface that come together to create a literary experience. Key to the success of such an approach will be designing works that transition audiences from initial expectations toward an understanding to which each element contributes.
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Hyperlinking in 3D Interactive, Multimedia Performances

Fig. 1. Performer with tracking device in 3D space.

A dancer reaches her hand out toward the center of the performance space. She is holding an infrared tracking device. Sensors situated in each corner of the space pick up the infrared signal emitted from the device in the precise X, Y, Z locations and cause the dancer’s movement to evoke a series of musical notes. As she glides her hand back and forth across the space, the notes go back and forth in the musical scale. When she bends down and places the device on the floor of the space, the music stops. Raising her hand above the floor evokes sounds once again.

This description of an event in a sensor-based interactive, multimedia performance introduces the focus of this essay—that is, hyperlinking is not a

Works Cited


