A Framework for Interactive Art in Narrative Forms

Jeho Oh, GSCT, KAIST, South Korea
Chungkon Shi, GSCT, KAIST, South Korea

Abstract: The aim of this study is to create a framework for interactive art in narrative forms. This study presents the categorization of interactive art into three elements. We establish a conceptual framework for the development of narrative, and we use this framework as the basis for the creation of the prototype of interactive art in narrative form. Interactive art is a form digital installation based art that involves the audience in a way that allows the art to achieve its purpose. Due to technological limitations, interactive art is not yet advanced enough to allow audiences create the narrative. According to the progress of digital technologies, the audience can interact with a character on the screen that has an autonomous role by digital devices. Compared with previous interactive art, interactive art in narrative form provides a “flow” of experience to the audience and involves the audience in a way that allows the art to achieve its purpose. In order to create a framework of interactive art in narrative forms, first, we must categorize interactive art from the viewpoint of narrative. Interactive art can be divided into three categories based on the style of narrative - poetic style, mixed style and narrative style. Within these three categories, to develop the narrative, we revise previous methodologies of the narrative using interactive storytelling. Based on this framework, the author produces interactive art in narrative forms.

Keywords: Interactive Art, Interactive Storytelling, Narrative Forms, Poetic Style, Mixed Style, Narrative Style

Introduction

Background and Motivation

This study discusses interactive art from an audience perspective. Interactive art is a new form of media art that has grown out of the development of new technologies. It is a form of digital installation-based art that aims to involve its audience in a particular way that allows the art to achieve its purpose. Digital culture is ongoing, a still-evolving culture, and the public’s notion of digital interaction is also continually evolving. Operational sense of interaction: combination of ‘control-communication based interaction’ and ‘liminal-transitive interaction’. Relational sense of interaction: combination of ‘communication with through the medium interaction’ and ‘instrumental-dialogue interaction’ [1]. Combination of each mode of interaction is related in interactive art. Interactive is defined as ‘Inter,’ which refers to the relationship between the audience and the object, and ‘active’ which means action. In interactive art, works are presented in half of the unfinished work and the audience completes the work as half of the originator [2].

The audience is the main actor in the interactive art, its participation given a significance beyond instant amusement or spectacle. It is important to participate in artwork in interactive situation through a digital installation. Narrative gives the audience a method of participation.
and a sense of that participation being meaningful. Only one action of the audience makes artwork per once. The audience requires continuing participation and developing action. Interactive art requires methodologies that immerse the audience in the artwork. Through narrative - storytelling that absorbs the participant, - the audience participates meaningfully in interactive art.

Aim of the Study

The aim of the Study is to create a framework for interactive art in narrative form. This study describes three categories of interactive art; the poetic, mixed and narrative styles. We establish a conceptual framework for the development of narrative; use this framework as the basis for the creation a prototype of interactive art in narrative form. Through this framework, a prospective author should be able to produce interactive art in narrative form. This art should be novel and meaningful to those who produce it.

Literature Review

Research on Interactive Art

Little research has been done on the relationship between interactive art and narrative, with most studies of interactive art focusing on the effectiveness of interactivity [2] and factors relating to audience participation [5] [6] [7]. These studies have been concerned mainly with audiences engaged in a type of play whose primary purpose is amusement; with the way audience members participate in interactive art using their entire bodies; with audience participation as the main motivation behind the artwork; and with what makes such art different from previous art forms.

The action of the audience is the primary subject of these studies. Brigittal Zics shows not only how interactive art produces machine-human interaction, but also the way it connects the artist with the participant [5]. Ann Morrison discusses an artist’s interactive installation work, the primary means of interacting with, which is bodily gesture [6]. Nathaniel Stern, meanwhile, puts contemporary theories of embodiment and performance in the service of interactive arts criticism. These studies examine bodies-in-relation, and interaction as performance. Most writing on interactive art will explain that a given piece is interactive, and how it is interactive, but how we interact. The implicit body framework, on the other hand, explicates participants’ physical actions, enabling critical readings of that which is performed [7]. Other studies have investigated production models of interactive art [3][4].

Based on their experience in the creation of interactive artwork, several researchers describe their frameworks and prototypes. Many studies focus on installations they implemented by the authors; from conception to completion of the installation, they represent the process of the artwork. These studies fall into two categories. Examinations of the process of creating interactive art taken as a whole; and studies that examine fragments of the process individually. The iCinema Centre for Interactive Cinema Research, at The University of New South Wales, produces both interactive art and a new type of narrative within it. “Scenario” which was produced by iCinema Centre creates a mixed reality (MR) environment, surrounding the user within a 360-degree stereoscopic space, in which they can interact with digital characters that have a level of autonomy. [3]
Research on Interactive Storytelling

There has been much research into the structures of interactive storytelling [8][9][10][11]. Interactive branch structures help the audience understand such storytelling. In some of this research, multiple stories are produced by the audience. The audience’s choices determine the outcome of the story in real time. Such studies establish the first temporal theorization of interactive narrative. The interactive system it elaborates expresses a transcriptive framework that is naturally resonant with the digital. Transcriptive narrative is a recursive system made up of a large number of self-organizing and interdependent elements, able to launch the beholder into richly textured engagements with cultural information [8]. Marc Cavazza’s research presents a new form of the interactive storytelling based on Hierarchical Task Network (HTN) structure. Authors introduce a character-based interactive storytelling prototype that uses HTN planning techniques to support story generation and anytime user intervention [9].
Character-based systems provide a unified principle for story generation and interactivity. As such, they allow anytime interaction [9]. Many studies deal with a generator who creates a situation automatically [12][13][14][15]. These systems make it possible to produce a narrative based on a generator audience that chooses the situation. However, these studies propose a prototype only for brief situations due to technological limitations. Thus, the limitation placed on an author when designing a story leads to the creation of poor story content.

Archetype-driven character dialogue generation for interactive narrative makes character dialogue generation and prototype of artwork. Rowe proposes an archetype-driven character dialogue generator that uses a probabilistic unification framework to generate dialogue mo-
tivated by character personality and narrative history to achieve communicative goals [16]. Microsoft Research Cambridge describes the design of a tabletop storytelling application for children, called TellTable. The goal of this system is to allow children to develop their own stories using elements created through photography of real-world objects and through drawing. This system has the potential to support collaboration in both the development of characters and in the telling of stories. [17] [18].

Figure 4: TellTable being used by Children [17]

Figure 5: System Interfaces. (a) Make Mode. (b) Tell Mode [18]

Limitations of Previous Research

In summary, research on interactive art in a narrative form reveals the existence – in stories of a chain-reation narrative structure. Interactive storytelling is limited in terms of its basic structure. Many researchers neglect the value of the amusement caused by audience immersion. The choice of a branch structure is not only a characteristic of the narrative but also a process through which to choose the narrative. If interactive art is to be better than previous art forms, narrative forms must be constructed that allow the audience to play the role of main actor. This creates a situation in which the audience enjoys participating. Briefly virtual images and spectacles are of limited interests. That means additional connections are needed between audiences and artworks. Audiences participate in artworks through narrative; through the process of developing the story, not just through a single movement and repetitive reactions. This process of the narrative increases interest.
Categorization of Interactive Art in Narrative Forms

Analytic Frame

In order to create a framework of interactive art in narrative forms, it is necessary to categorize interactive art from the viewpoint of narrative. In this study we describe a methodology for narrative analysis, which incorporates the following references: From “Interactive Storytelling Techniques for 21st Century Fiction” by Andrew Glassner, we refer to the structure of narrative, including character, plot, and story technique. Then, we bring in the idea of “Somebody wants something badly and is having difficulty getting it,” from “The Tool of Screenwriting: A writers guide to the craft and elements of a screenplay” by David Howard and Edward Mabley. Interactive art in narrative form incorporates these ideas, based on the previous studies of narrative.

Table 1: Structure of Narrative [20]

<table>
<thead>
<tr>
<th>Factor</th>
<th>Narrative Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main-objective</td>
<td>The character wants to be or to do something</td>
</tr>
<tr>
<td>Main action</td>
<td>The action of the character</td>
</tr>
<tr>
<td>Obstacle/conflict (competition)</td>
<td>Obstacles and conflict overcome by the character’s actions</td>
</tr>
<tr>
<td>Development</td>
<td>Development of the narrative through conflict overcome by the character in phases</td>
</tr>
<tr>
<td>Climax and ending</td>
<td>Climax and ending brought about by the character’s actions and choices</td>
</tr>
</tbody>
</table>

This table shows the basic elements of narrative. We observe interactive art from this viewpoint. Based on the theory of narrative, we develop a framework of the narrative. Interactive art can be divided into three categories based on the style of narrative; poetic style, mixed style, and narrative style.

Category 1 - Poetic Style

Poetic style describes artwork that gives the audience a fun experience in a short and poetic situation.
An audience stands in front of an interactive art installation. Their actions result in corresponding reactions from the installation: Their hand is “reflected” by a “wooden mirror”, or their whole body is viewed as an object on a screen. These artworks enable real-time feedback. Periodically, audience members experience momentary pleasure or other emotions or responses. Many interactive artworks are done in the poetic style, reflecting the fact that many interactive artwork are categorized as fine art, which typically features little in the way of narrative. The other reason is that they are bound by technical limitations. The works “Wooden Mirror” and “Text Rain” are not narratives. They feature only audience actions and reactions to the object or screen. Table 3 takes the work “Phantasm” as an example.
Table 2: Structure of Narrative in “Phantasm”

<table>
<thead>
<tr>
<th>Factor</th>
<th>Narrative Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main-objective</td>
<td>The audience wants to call butterflies</td>
</tr>
<tr>
<td>Main action</td>
<td>Moving the red ball</td>
</tr>
<tr>
<td>Obstacle/conflict (competition)</td>
<td>No conflict</td>
</tr>
<tr>
<td></td>
<td>• The red ball is a real object but the movement of the virtual butterflies is on a virtual on-screen experience</td>
</tr>
<tr>
<td>Development</td>
<td>No development</td>
</tr>
<tr>
<td></td>
<td>• Only a rise/decrease in the number of butterflies</td>
</tr>
<tr>
<td>Climax and ending</td>
<td>The climax is the achieving of the maximum number of virtual butterflies</td>
</tr>
<tr>
<td></td>
<td>• Ends with the ceasing of the action</td>
</tr>
</tbody>
</table>

**Category 2 - Mixed Style**

Mixed style artwork is “poetic style” artwork derived from an existing narrative. Audiences take a role in a well-known narrative. In a short period of time, they can become characters in the story. Audience action plays the main role in the artwork.

Figure 9: Takahiro Matsuo, Prince and Migrant Birds, 2010

Figure 10: Hyojung Seo, Snow White on Table, 2008
An example of a mixed-style is “Prince and Migrant Birds” by Japanese artist Takahiro Matsuo. In his previous artwork “Phantasm,” participants moved a red ball, which is followed by butterflies on a screen. In “Prince and Migrant Birds,” the audience members find themselves in a scene from the popular novel “The Little Prince” by French author de Saint-Exupery. Entering the artwork, the audience member becomes the Prince, as the image of the Prince on screen disappears. When the audience member moves a red ball, the migratory birds move back and forth or up and down in response. This artwork does not have a narrative. There is only movement corresponding to action. To be classified as interactive art in a narrative form, a work must contain five elements of narrative.

<table>
<thead>
<tr>
<th>Table 3: Structure of Narrative in “Prince and Migrant Birds”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor</strong></td>
</tr>
<tr>
<td>Main-objective</td>
</tr>
<tr>
<td>Main action</td>
</tr>
<tr>
<td>Obstacle/conflict (competition)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Development</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Climax and ending</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

“Snow White on Table” by Hyojung Seo is in the mixed style. The interactive artwork borrows from the well-known story of “Snow-White” using the shadow of a Snow-White doll to create a story in accordance with its location on a table manipulated by the audience. For instance, Snow-White may drift away from the prince or be killed by a hunter depending on the location of the doll, creating multi-level stories that differ from the familiar, original narrative. The audience is confronted, so to speak, with a range of possible results via the multi-level stories. However, they are still limited by the pre-set narratives of the author, and multi-level narratives are not produced based on a narrative structure. Furthermore, audience members take on the roles of speakers, but not creators. Thus, they are confined to merely directing a scene. This artwork has a fixed narrative set by the author. By becoming speakers, participants simply play a role conceived of by the author.

**Category 3 - Narrative Style**

Narrative style describes artworks in which the audience creates a narrative. There are many stories developed through audience participation with no fixed narrative.
Interactive art in narrative style has the following elements;

1. A character who wants to do something
2. Action on the part of the character
3. Obstacles and conflict overcome by the character’s actions
4. Development of narrative in through conflict overcome by the character; and
5. A climax and ending brought about by the character’s actions.

“The Legible City” is an artwork created by Jeffry Shaw. Audience members ride a bicycle through a moving, on-screen environment, experiencing a virtual adventure. The audience does not create a narrative but the work contains many elements of the narrative style.

Table 4: The Structure of Narrative about “Legible City” [20]

<table>
<thead>
<tr>
<th>Factor</th>
<th>Structure of Narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main-objective</td>
<td>The audience wants to go on a trip</td>
</tr>
<tr>
<td>Main action</td>
<td>Riding a bicycle</td>
</tr>
<tr>
<td>Obstacle/conflict (competition)</td>
<td>The audience go on a trip to various building made by virtual text. This is a process of the adventure consist of three course. The bicycle is a real object but adventures are on the screen.</td>
</tr>
<tr>
<td>Development</td>
<td>No development</td>
</tr>
<tr>
<td>Climax and ending</td>
<td>The climax is the destruction of the virtual building that is consisted by huge image symbolized by text. The ending is finish of the trip</td>
</tr>
</tbody>
</table>

“The Legible City” has a narrative, with obstacles and conflicts – the basic narrative methodologies – through which the audience must proceed as it experiences its various adventures. This narrative is fixed, set by the author. The audience only plays a role in it. For this reason, the work does not fully incorporate the elements of narrative, which should be taken into consideration in future designs.
Framework for Interactive art in Narrative Forms

Methodology

Here we describe a methodology for narrative analysis drawing on some of the many references in this area. From Glassner’s “Interactive Storytelling Techniques for 21st Century Fiction”, we refer to the structure of a narrative, including the characters, plot - and story technique. We then bring in the idea “somebody wants something badly and is having difficulty obtaining it,” from Howard and Mabley’s “The Tool of Screenwriting; A writer’s guide to the craft and elements of a screenplay”.

Interactive art in narrative form incorporates these ideas, based on previous studies on narrative, specifically, “Writer’s Journey; Mythic Structure for Writers” by Christopher Vogler.

We refer to the study “Setting the Scene: Playing digital director in interactive storytelling and creation”, which elucidates elements of narrative, especially character models.

• what the character feels in a certain situation,
• how he appraises an event,
• his values and norms,
• his goals,
• his affective relations, and
• his decisions [19].

We also refer to the study “Creating Simultaneous Story Arcs Using Constraint Based Narrative Structure.” [12]. This study describes two kinds of narrative structure; constituent declaration and constraint declaration.

In the previous chapter, we listed the basic elements of the narrative as;

1. Main-objective
2. Main action
3. Obstacle/conflict (competition)
4. Development; and
5. Climax and ending

To develop the narrative in narrative style works, we revise previous methodologies of the narrative using interactive storytelling. Because a character’s action in such narrative originates forms through the audience action, the previous methodologies are revised by interactive. The transformed elements are.

1. The audience wants to do something
2. Interactive nature of the audience’s action.
3. Obstacles and conflict overcome by the audience actions.
4. Development of narrative through conflict experienced by the audience; and
5. Climax and ending brought about through the audience’s actions.
Framework

The Audience wants to do something

The audience’s desire drives the narrative. A fully realized artwork contains a mission. This mission confers strength on the character and creates a feeling of rapid progress. In a work with individual chapters, the effects of this mission build up on the character. The interactive character is also imbued with this sense of mission. It is important that the audience possesses the homogeneity of the character. In existing kind of narrative, the audience feels united with the character. The interactive audience does not feel homogeneous, but it does act directly as the character.

Interactive Nature of the Audience’s Action

We distinguish action from activity. The activity is everything there is to do; the action is that activity which the character wants to do. In narrative, the action carries the mission. In interactive art, action by the audience is not only action, but also activity. In producing interactive art in narrative forms, we produce audience action. This action advances the narrative. We initiate what the audience wants to do and the object of its action. These aims and actions make the narrative.

Obstacles and Conflict through by the Audience’s Actions

The goal of the audience’s action is difficult to achieve, but not impossible. The conflict experienced by the audience as it encounters obstacles advances the narrative. This conflict can be categorized as follows:
Table 5: The Categorization of Character Conflict in Narrative

<table>
<thead>
<tr>
<th>Factor</th>
<th>Character</th>
<th>Obstacles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dilemma style</td>
<td>Protagonist</td>
<td>Protagonist oneself</td>
</tr>
<tr>
<td>Individual conflict</td>
<td>Protagonist</td>
<td>Antagonist</td>
</tr>
<tr>
<td>Social conflict</td>
<td>Protagonist</td>
<td>Group(society)</td>
</tr>
<tr>
<td>Group versus group conflict</td>
<td>Group(society) belonged Protagonist</td>
<td>Group(society)</td>
</tr>
</tbody>
</table>

In the masterpieces of narrative history, these four elements affect the protagonist who is the main character in the narrative by creating conflict in the form of obstacles. The narrative of William Shakespeare’s *Hamlet*, for example, contains these elements. The title character of the *Oedipus* by Sophocles plays faces four obstacles and conflicts as he seeks solutions to his crisis. Interactive art in narrative forms considers character conflict from these angles.

**Development of Narrative through Conflict Experienced by the Audience**

The conflict in a narrative is strengthened through audience action, as the audience overcomes hardships through its efforts. This process is absent from Matsuo’s “Prince and Migrant Birds”; obstacles do not feature in Shaw’s “The Legible City.” An audience becomes immersed in a narrative by overcoming a crisis. Through the challenge it mounts to this conflict, the audience develops its career and “self-realization.” The first obstacle is weak. The next obstacle is more powerful. The exertion of overcoming the obstacle allows the audience to develop. This process finally leads to the climax. The audience becomes immersed in the experience by gradation.

![Interactive Narrative Arc](image)

Figure 13: Development of the Interactive Narrative’s Arc

The most important thing is the development of the narrative through gradation of conflict as experienced by the audience.
**Climax and Ending brought about by the Audience’s Actions**

Interactive artworks feature a climax and ending brought about by the audience’s actions. It is important that the audience’s actions affect the structure of the narrative. The climax is the peak period of conflict in the narrative. It is here that the audience experiences the most powerful conflict in the narrative.

![Interactive Narrative Arc](image)

**Figure 14: Climax and Ending of the Interactive Narrative’s Arc**

When it comes the time to solve the problem, audience action is essential to the artwork. The ending is the resolution of the narrative’s climax. The audience is satisfied with the ending because it was brought about through the audience’s own actions. In this respect the narrative differs significantly from narratives with closed endings developed by the author. The following table shows the framework for interactive art in narrative forms.

**Table 6: The Framework for Interactive Art in Narrative Form**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Interactive Art in Narrative Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main-objective</td>
<td>The audience wants to be or to do something</td>
</tr>
<tr>
<td>Main action</td>
<td>Interactive actions of the audience.</td>
</tr>
<tr>
<td>Obstacle/conflict (competition)</td>
<td>Obstacles and conflict overcome through the audience’s actions</td>
</tr>
<tr>
<td></td>
<td>- First / second / third obstacle</td>
</tr>
<tr>
<td>Development</td>
<td>Development of a narrative through conflict experienced by the audience</td>
</tr>
<tr>
<td></td>
<td>- First / second / third development – try to overcome the crisis</td>
</tr>
<tr>
<td>Climax and ending</td>
<td>The climax is the peak period of conflict in the narrative as developed</td>
</tr>
<tr>
<td></td>
<td>by the audience action</td>
</tr>
<tr>
<td></td>
<td>The ending results from the audience’s choices</td>
</tr>
</tbody>
</table>

**Conclusion**

Interactive art is new media artwork due to digital technologies. The more advancing technologies, the more audience plays various roles in art. Narrative aids to audience to perform the interactivities meaningful and funny. In order to create a framework of interactive art in
narrative forms, we must categorize interactive art from the viewpoint of narrative. Interactive art can be divided into three categories which are poetic style, mixed style and narrative style. Based on these categories, we revise previous methodologies of the narrative using interactive storytelling. In this research, we produce the framework. Through a framework, the author produces interactive art in narrative forms.

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About the Authors

Jeho Oh
Jeho Oh is a master in the Graduate School of Culture Technology in KAIST and researches interactive artwork and performance in the Communication and Interaction Lab. He is an author.

Dr. Chungkon Shi
Dr. Shi is a professor at KAIST (Korea Advanced Institute of Science and Technology)’s Department of Humanities and Social Sciences, Graduate School of Culture and Technology.