Resolutions to Some Problems in Interactive Storytelling

Volume 1

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Abstract

This thesis addresses a number of related problems that have long been the subject of debate among theorists and practitioners of interactive storytelling. Foremost among them are two, the Problem of Internal Consistency and the Problem of Narrative Flow, that are caused by a perceived tension between a player's desire for interactive freedom and agency, and an interactive story designer's ability to offer a coherent story-like experience. The thesis shows how the problems arise from faulty, and often unstated, assumptions about what the ideal interactive storytelling experience should be like. I propose a new schema for understanding the relationship between the player and the designer, and for understanding the player's role in creating his own experience. According to this schema, the player accepts a degree of responsibility for the coherence of his own experience, which is directly proportional to the degree of freedom that the software offers him. The problems are thus resolved.

The thesis also discusses a variety of other issues related to interactive storytelling that I have considered over the years: the fact that players are often expected to enact a character who knows more about the story world than the player actually does, which I call the Problem of Amnesia; the overloading of the term *conflict*; a false analogy between dramatic tension and gameplay tension; an idea called a *credibility budget*, which I suggest as a possible feature of a future automated story-generation system; some emotional consequences for players that attend implementation of agency by various means; and certain challenges that face development of a semiotics for video games.

The thesis concludes with a template and guide to writing a requirements specification for interactive storytelling experiences. I present arguments for the value of requirements specifications as design tools both for practitioners and for students.

Dedication

This work is respectfully dedicated to Willie Crowther and Don Woods, creators of *Adventure,* who first set my feet upon the road.

Acknowledgments

The research presented in this thesis was conducted over a period of 16 years, from 1995 to 2011. I could not possibly list all the people who have given me advice and insight during that time, and will have to confine myself to a few who were especially generous with their time and thoughts.

My greatest debt is of course to my adviser, Clive Fencott, who first suggested that I work towards a PhD by Completed Work at the University of Teesside, and who offered me the position of Visiting Fellow at that institution, without which this work would not have been possible. His encouragement and support have been invaluable.

It was during a lecture delivered by Ken Perlin at the Virtual Storytelling Conference ’05 in Strasbourg, France, that I had the insight that forms the nucleus of this thesis. If Ken had not made the offhand remark, “The cost of an event in an interactive story should be directly proportional to its improbability,” I would have had rather less to say. Since then Ken and I have had many long and fruitful conversations about interactive storytelling at a variety of conferences, for which I am very grateful.

Michael Mateas was particularly helpful during the writing of this thesis, and he is the scholar from whom I quote the most. I remain an awed admirer of his seminal work *Façade,* created with Andrew Stern.

Chris Bateman’s advice on the Template and Guide to Writing a Requirements Specification for Interactive Storytelling (Appendix V) was enormously helpful.

Steven Bachelder, Ian Bogost, Henry Jenkins, Jesper Juul, Janet Murray, Jim Simmons, Rich Carlson and Ulf Wilhelmsson have all provided inspiration and shown me kindness, and I thank them. Thanks also to Anna-Sophia Alklind Taylor for telling me how she unintentionally violated the plot of *Syberia II*.

Finally, I could never have done this work with the generous support and eagle eye of my wife Mary Ellen Foley, who read the manuscript in draft and made many helpful suggestions. The words are all mine, however, and all responsibility for any errors or omissions lies with me.

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Volume 2 Table of Contents

Volume 3

Volume 3 consists of my book *Fundamentals of Game Design,* written with Andrew Rollings, incorporated by reference.

Volume 4

Volume 4 consists of my book *Fundamentals of Game Design, Second Edition,* written entirely by me and incorporated by reference.

1 Introduction and Historical Background

Games take place in a notional, or pretended, reality that may be more or less representative of the real world. (Adams 2009, pp. 3–6, 36) Such ancient games as mancala or pachisi are almost entirely abstract and unrepresentative of the real world. Games like *Monopoly* (1935) are more representative; they employ concepts modelled after real-world ones (money, streets, houses, taxes). At the other end of the scale from mancala and pachisi, war games as played by military organizations, in which thousands of people use real military equipment to simulate warfare, represent the real world as closely as they can without killing anyone.

Because representational games usually include fictional characters and settings, and dramatic situations, game designers naturally began to weave story-like elements into the players' experience: exposition, dialogue, and above all, plot. *Dungeons & Dragons* (1974) may have been the first game of this kind. Using a set of general rules, one person, the dungeon master, designs a quest for the players to undertake, incorporating causally-related events that the participants will interpret as part of a story's plot. (Salen & Zimmerman 2004, p. 406) In single-player video games also, designers began to incorporate plots into the progress of the games. *Zork* (1977) was probably the first such game. *Adventure* (1976), also known as *Colossal Cave,* pre-dated *Zork* but the experience of playing *Adventure* did not include enough plot-like events for the game to qualify as a story.

It soon became apparent, both in tabletop and computerized games, that certain difficulties attended efforts to provide players with a well-formed story while at the same time allowing them to play the role of characters in that story. In *Dungeons & Dragons,* the players did not always perform the actions that the dungeon master expected them to perform, which forced the dungeon master either to rapidly rewrite the story to maintain coherence or—less often—use his special powers in the game to compel uncooperative players to act coherently with the story. (Wyatt 2008, pp. 28–29) In video games, software presents the game world, play experience, and story events. It is difficult for software to rewrite the story to accommodate the player, but it is easy for software to constrain the player's behaviour. However, some players value control and freedom of expression. (Sweetser 2004) In 1995 I gave a lecture

called “The Challenge of the Interactive Movie” (Adams 1995) in which I named this conflict between the player’s desire for freedom and the designer’s ability (and obligation) to produce a coherent story the Problem of Internal Consistency.

This thesis discusses the Problem of Internal Consistency and some of the other conceptual and practical problems of interactive storytelling in computerized media, and my research efforts over the period 1995–2010 to resolve them. Chapter 10 introduces a new schema, which I first described briefly in 2006, that I believe succeeds. In 2011 I argued for a new approach to designing computerized interactive stories, an approach that involves writing a requirements specification for the play-experience that the designer wishes to construct. I have written a template for such a requirements specification, and a guide to writing the requirements specification, which are available as Appendix V in Volume 2.

1.1 Conventions Used In This Thesis

This section covers a small number of linguistic conventions that I have adopted.

1.1.1 Pronouns

As English does not have a gender-neutral pronoun for human beings, I use *he* and *she* roughly alternately for such generic individuals as “the designer” and “the player”. Each pronoun should be considered to include persons of both sexes.

1.1.2 Terms for the Producers and Consumers of Stories

It is unfortunate that the terms used to name the creators and the audience for storytelling vary with the nature of the medium. Those who write books are *authors* and those who read them are *readers*; those who create films are *filmmakers,* while those who write plays are *playwrights.* People who watch films, television, or plays are *viewers* or the *audience*, and so on.

This thesis frequently refers to distinctions between the consumers of all non-interactive, presentational media—whether books, films, radio, television, stage plays, or any others—and the consumers of interactive media. As there is no unified term for the individual consumer of presentational media, and video games are most frequently compared with film, I have chosen to use *viewer,* and to incorporate by

reference the idea of the reader and the listener. (Exceptions occur in cases where I refer specifically to books or audible media).

I use the term *player* for the participant in an interactive story, for reasons that I explain in more detail in section 3.1.1. I refer to all those who make creative or technical decisions that affect the player's experience in building interactive media as *designers. The designer* refers to them all collectively. (Note that this can include the software engineers who build the game engine, if they make decisions that the player can become aware of.)

1.2 Excluded Subject Areas

Interactive storytelling has been the subject of a vast amount of experimentation and scholarship, and my own research has examined only part of it. Here I list some areas that this thesis does not address.

1.2.1 Static Hypertext

Hypertext has a long history, beginning perhaps with Borges' 1941 short story "The Garden of Forking Paths" and Vannevar Bush's description of MEMEX in the July 1945 edition of *The Atlantic Monthly* (Bush 1945). Much ink has been spilled by narratologists on the semiotics and aesthetics of hypertext, and some have made efforts to unify static hypertext, other forms of hypermedia, and computer games. They were partly encouraged in this by the (accidental) fact that the earliest storytelling computer games—text adventures such as *Adventure* and *Zork*—were text-based. However, there is an enormous difference between static hypertext and text adventures, and a difference not only of degree but of kind. Static hypertext consists only of a text with embedded links which the reader may choose to follow or not. This is not interactive storytelling according to my definition of the term (which can be found in section 3.1.5), because the reader does not participate in the story as an actor; he cannot contribute actions to the plot. He simply reads a fixed text in a certain order, although there may be a variety of supported paths through the text and the reader has a small amount of control over the order in which he reads. In contrast, computerized text adventures include opportunities for the player to engage with the game world as an actor, and mechanics that determine the consequences of his activities.

Greg Costikyan addressed hypertext fiction in “Where Stories End and Games Begin”, and he noted,

> Hypertext fiction lacks one of the key ingredients that makes games compelling; there is no real goal for the reader other than getting to a point where he or she “gets” the story. You’re faced with a series of decisions—follow this path or that one—but there is no context for your decision. There is no reason other than the desire to explore to choose one path over another. Reading hypertext fiction, unlike playing a game, is purposeless exploration and does not produce the same sense of desire, of compulsion, to “play.” In other words, hypertext fiction is an unhappy compromise between traditional stories and games. (Costikyan 2000, p. 46)

This thesis does not address static hypertext, for two reasons. The first and most obvious is that I have not dealt with it in the course of my career, so I have no work upon the subject to cite in a PhD by Completed Work. The second and more general reason is that, as explained above, static hypertext does not offer interactive storytelling.

However, the thesis *does* address text adventures and other forms of text-based play (including other kinds of hypermedia) in which the player participates as an actor.

1.2.2 Multipresent Interaction Models

I use the term *interaction model* to describe a collection of design decisions that determines how a player, sitting in the real world, projects her will into the virtual world. (Adams 2009, p. 38) User interface software implements the interaction model that the designer has created. Designers use many interaction models, but the two most common are avatar-based interaction and multipresent interaction.

In avatar-based interaction, the player projects her will through a character or object that represents the player in the virtual world. A key characteristic of avatar-based interaction is that the player must move the avatar through the simulated environment in order to act in different locations. These movements take time and are often impeded in various ways.

In multipresent interaction, the player may act at different locations in the virtual world at any time by metaphorically reaching into the world from the outside, usually with a pointing device. Nothing represents the player in the world, and the

player may change her view of the world—the position of the virtual camera that displays the world—freely, instantly, and without cost.

Avatar-based interactive storytelling is overwhelmingly the most common kind. Avatar-based interaction has familiar parallels with the theatre and other media in which people enact characters, and consequently, both designers and players have expectations about what players should be able to do in games that implement this model. Certain problems arise when the designer's expectations do not match the player's; this thesis addresses some of those problems. Multipresence-based interactive storytelling is comparatively rare, and players have few expectations about what it should be like because there are no obvious parallels with other media. (*Prom Week*, an experimental game from the Expressive Intelligence Studio at the University of California at Santa Cruz, is a notable exception. (McCoy 2011)) Consequently, most of the challenges that face the designer of interactive stories apply only to the avatar-based model, and the majority of my contributions to the literature have addressed only this model.

1.2.3 Multiplayer Contexts

Mutiplayer video games (that is, games designed to be played by multiple human players) may be roughly divided into *multiplayer local*, in which all the players view the same screen; *multiplayer networked* or *distributed*, in which each player has her own screen that shows information specific to her; and *massively multiplayer*, in which hundreds of players experience the same game world over a network, but they do not all interact with each other at the same time (they act asynchronously). In each of these cases, the designer's relationship to the players is different from his relationship to the player in a single-player game. The designer of a multiplayer game seeks to enable the players' social interactions with one another as well as their gameplay interactions. As they play, the players are more concerned with each other's actions, motives, and roles than they are with the designer's intentions. Interacting with the other players, rather than with the designer, forms the largest part of the experience, especially if the gameplay is competitive.

The designer of a single-player game has an intimate relationship with his player, not unlike that of a novelist and her reader. The designer knows that the player interacts

only with the designer's own constructions (which may include simulated characters but not human ones). The player is not concerned with the actions of other players, as there are none; rather, she is concerned with the design of the game itself—and therefore with the mind of the designer. Dedicated players are often acute critics of game design and well aware of the designer's creative presence. I discussed these distinctions at greater length in the lecture "Single-Player, Multiplayer, MMOG: Design Psychologies for Different Social Contexts". (Adams 2010a)

Interactive storytelling becomes much more complex in multiplayer contexts. The designer must create an experience in which all of the players feel themselves to be part of a story, and that means that each must have her own role to play. The story must either be an ensemble work in which no single player is the protagonist, or a collection of stories in which each player is the protagonist of her own personal story. This naturally limits the kinds of stories that the designer can create. In a massively multiplayer game, the sweep of the story must be epic, involving hundreds or thousands of independent characters, none of whom is central.

The main body of this work does not address the many issues that relate to interactive storytelling in multiplayer contexts. Throughout my career my research has concentrated upon the design of single-player storytelling experiences, and this is reflected in the materials submitted as part of my thesis. However, I have begun recently to think about storytelling in massively-multiplayer contexts, and I propose some new work for the future in the final chapter, section 15.3.

1.2.4 Low-Interaction Automated Story Generation Systems

In recent years a number of experimental works have implemented automated story generation in which the player interacts very little, or does not interact as a character in the story. In Porteus *et al.*'s Merchant of Venice system, the player has the power to alter the development of the story by changing the point of view among the principal characters, but does not actually enact one of the characters. (Porteus 2010) Chen *et al.*'s RoleModel tool goes still farther; it is designed to assist authors in generating stories, not to create experiences for a player. (Chen 2010) While these and similar works in automated story generation are invaluable for their contributions to the problem of story credibility (particularly the psychological credibility of

automated characters), they do not address the questions that have concerned me as a researcher. The object of my work has been to resolve certain problems associated with player freedom and agency, and those considerations are absent in low-interactivity automated story generation systems.

1.3 Organization of the Work

My career has spanned 23 years, and in that time I have studied and written about a wide variety of subjects—many more than are included here. To make it all coherent, I have chosen to organize this thesis by topic, and to discuss my work, and that of others, chronologically within each topic.

1.3.1 Literature Survey

A traditional PhD thesis is devoted to a single topic and typically includes a chapter that surveys the work of others on the same topic. Because this is a thesis for a PhD by Completed Work, and covers a variety of topics over a wide scale of time, I have chosen to incorporate the views of other authors into each discussion individually.

Generally speaking, I start the discussion of each topic by quoting from the work in which I first addressed the subject. This is followed by analysis from other practitioners in the field, whether they agree or disagree with my view. Finally I include a critique of my original position, demonstrating its weaknesses (if any) and showing how my thinking has changed in the course of my career, with relevant quotations from my later works.

1.3.2 Volumes Included

I have divided the thesis into four volumes. Volume 1, this one, contains the primary text of the thesis itself, and the references and a gameography.

Volume 2 includes my research CV as Appendix A, and the key lectures and articles I have cited that form the basis of my application for a PhD by Completed Work. The works in Volume 2 are organized chronologically and identified as Appendices B–V. For further discussion see section 2.3.

Volume 3 is my 2006 university textbook co-authored with Andrew Rollings, *Fundamentals of Game Design*. The parts of this work that I cite were written by me.

Volume 4 is an expanded and revised edition of the preceding work, *Fundamentals of Game Design, Second Edition,* written entirely by me.

1.3.3 Volume 1 Chapter Overview

Volume 1 of the thesis is divided into the following chapters:

1. **Introduction and Historical Background** – the current chapter. Describes the origins of interactive storytelling; sets out the organization and boundaries of the work.

2. **Overview of Adams's Contributions** – lists the principal ideas in the thesis and names my primary works that have addressed them.

3. **Key Terms and Concepts** – defines key terms of art; describes mechanisms for interactive storytelling commonly used in video games.

4. **"The Challenge of the Interactive Movie"** – discusses this seminal lecture (Adams 1995), the starting point for all my subsequent work on interactive storytelling. This lecture introduced four major subjects of inquiry addressed in this thesis: the problem of amnesia, the problem of internal consistency, the problem of narrative flow, and the tension between player freedom and well-formed stories.

5. **The Problem of Amnesia** – Games sometimes require a player to enact an avatar who knows more about the game world than the player himself does. Chapter 5 discusses this topic and offers a resolution.

6. **The Problem of Internal Consistency** – Players participating in an interactive story may have the power to act in ways inconsistent with the plot, the character they are playing, or the story's world. Chapter 6 discusses this topic. A resolution for the problem appears in Chapter 11.

7. **The Problem of Narrative Flow** – A player interacting with a story may be able to prevent the plot from advancing, or may be able to skip precursor events required to make the story's dramatic climax coherent. This chapter

introduces this problems and discusses a variety of possible solutions. Chapter 11 offers a resolution.

8. **The Tension Between Player Freedom and Well-Formed Stories** – The problems of internal consistency and narrative flow are actually different manifestations of this underlying issue. Chapter 8 discusses this tension.

9. **Faulty Underlying Assumptions** — The issues addressed in chapters 6–8 are exacerbated by several underlying assumptions about what an ideal interactive storytelling experience should be like. In this chapter I highlight these assumptions and show how they cause problems for designers trying to build interactive stories.

10. **The New Vision: A Designer/Player Role-Playing Contract** — This chapter, the heart of the thesis, sets out my reformulation of the nature of interactive storytelling as introduced in my lecture "A New Vision for Interactive Stories". (Adams 2006a) I characterize interactive storytelling as a collaboration between the designer and the player, with each accepting a proportion of the responsibility for the quality of the player's experience. An implicit contract governs the collaboration.

11. **Resolving the Problems** – an extensive discussion of the issues in Chapters 6–8 and their resolutions, both as theoretical problems and as practical challenges for designers implementing interactive storytelling systems. The schema from chapter 10 is instrumental in the resolution.

12. **Other Contributions** – In addition to the issues addressed in chapters 5–11, I have written on several other subjects related to interactive storytelling. Chapter 12 addresses such issues as the overloading of the term *conflict*, the false analogy between dramatic tension and gameplay tension, the emotional consequences attending different types of agency, and others.

13. **Defining A Requirements Specification for Interactive Storytelling** – introduces and argues for a new type of design document that will assist in creating interactive storytelling systems. It calls for designers to write a

requirements specification for the interactive storytelling experience that they wish to offer. A template and guide for writing such a document is provided in Appendix V.

15. **Conclusions and Future Work** – summarizes the work and demonstrates its contribution to our understanding of interactive storytelling.

2 Overview of Adams's Contributions

In the course of my career I have written and lectured on many topics. This section lists the contributions that I feel are most relevant to interactive storytelling, the main subject of this thesis. My research CV may be found in Appendix A.

2.1 Objective of the Work

My primary objective in researching interactive storytelling has been to resolve two problems that arise from a perceived tension between a player's desire for interactive freedom and agency, and an interactive story designer's ability to offer a coherent story-like experience. In 1995 I identified these problems and named them the Problem of Internal Consistency and the Problem of Narrative Flow, respectively. Since that time the Problem of Internal Consistency has been the subject of considerable debate both in the industry and the academy.

In addition to these issues I have sought to resolve another question that I called the Problem of Amnesia, which concerns the situation of players required to role-play a character who knows more about the virtual world he inhabits than the player actually *does* know. Finally, I have in the course of my career identified and commented on a variety of other ideas related to interactive storytelling. Several of the latter may be found in chapter 12, Other Contributions. Among them, for example, is a proposal that an automated story-generation system should maintain a system for tracking the credibility of the events that it generates, so as not to produce wildly non-credible stories. My work has tended to straddle the boundary between the theoretical and the practical.

Over the last 16 years my research has examined the assumptions and conceptual ambiguities that underpin the problems I have described. In the course of this study, I demonstrated, for example, that the participant's status in an interactive story is tripartite: as actor, audience, and player. Similarly, I identified four faulty assumptions that have misled practitioners about the goals for which they should be striving in interactive story design.

In 2006 I devised a new schema for understanding the relationship between the player and the designer of an interactive story and the function of each in creating the

player's experience. The schema posits that the tension between player freedom and well-formed stories may be mediated through the player's status as an actor. This has enabled me to resolve the Problem of Internal Consistency and the Problem of Narrative Flow, the objective of the thesis. I have also shown that The Problem of Amnesia arises from the tripartite nature of the player's status in an interactive story, and that the problem may be resolved by a sufficiently well-crafted introduction to the virtual world and the character of the avatar.

In "Rethinking Challenges in Games and Stories" (Adams 2007a, Appendix Q), I suggested (without providing further details) that it would benefit designers to create requirements specifications in advance of attempting to design an interactive story. In "A Requirements Specification Template for Interactive Storytelling" (Adams 2011a) I expanded upon this idea and proposed a template and guide for doing so. In this thesis, I make a more rigorous case for the value of such a document, and offer a revised version of the template and guide as Appendix V.

2.2 Career Summary

I have worked as a professional in the video game industry since March of 1989. During this period I performed a variety of roles: software engineer, lead game designer, writer, audio/video producer, design consultant and trainer, columnist, textbook author, and adjunct lecturer at several different institutions of higher learning. In addition to these activities I founded and served as the first chairman of the International Game Developers' Association (1994–1997), and I served on the board of directors of the Computer Game Developers' Conference (now called the Game Developers' Conference) between 1991 and 1995.

I have also served on a number of other advisory boards, program review boards, and juries for various prizes. My professional CV is available online at http://www.designersnotebook.com/Resume/resume.htm.

2.3 Primary Works

My primary work on the subject of interactive storytelling has taken the form of articles, books or book chapters, and lectures delivered at conferences and other events. Where appropriate, I have stated the number of times that a given work has

been cited. All my works collectively have been cited 813 times. All citation data is as of 17 March 2012, and drawn from Google Scholar.

- ***Designer's Notebook* columns**. *The Designer's Notebook* is the name of a long-standing paid column published by United Business Media LLC on *Gamasutra*, a web site for professional game developers. Most of the columns address subjects other than interactive storytelling, but I have included several in Volume 2 that are on point.

- ***Fundamentals of Game Design***. (Adams & Rollings 2006c) This university-level textbook, published by Prentice Hall in 2006, includes a long chapter (chapter 7) on interactive storytelling. Although Andrew Rollings is credited as co-author, the entire contents of chapter 7 were written by me. This book is incorporated as Volume 3 of the thesis. I include it here because it is the first publication in which I offered my own definition of *interactive story.* I address this question in section 3.1.5. Cited 26 times.

- ***Fundamentals of Game Design, Second Edition***. (Adams 2009) A revised and expanded edition of *Fundamentals of Game Design*, published by New Riders in 2009. This book is incorporated as Volume 4 of the thesis. I have included here both for its material on interactive storytelling (particularly the commonly-used storytelling mechanisms described in section 3.3 of this thesis) and as a general reference on the nature of video games and game design. I cite it frequently throughout the thesis. Cited 198 times.

- **Lectures**. I delivered almost all of the lectures included at meetings of the Game Developers' Conference (formerly the Computer Game Developers' Conference) in various years. For the most part these lectures did not appear in any published proceedings. Instead, I have transcribed them with minor amendments and made the text available on my professional web site.

The following works appear as appendices in Volume 2:

Appendix B: "The Challenge of the Interactive Movie". (Adams 1995) This lecture first introduced the Problem of Amnesia, the Problem of Internal

Consistency, and the Problem of Narrative Flow. I discuss the lecture extensively in chapter 4.

Appendix C: "Three Problems for Interactive Storytellers". (Adams 1999) A *Designer's Notebook* column reprising and expanding on the material in "The Challenge of the Interactive Movie". Cited 33 times.

Appendix D: "Eurostylin': An American Game Designer in Europe". (Adams 2000a) A lecture that discusses (among other topics) the emotional coherence of happy versus sad story endings in a game context.

Appendix E: "Death (and *Planescape: Torment*)". (Adams 2000b) A *Designer's Notebook* column chiefly about how games handle death as a subject; considers issues relating to specified versus unspecified avatars in interactive stories.

Appendix F: "Will Computer Games Ever Be A Legitimate Art Form?" (Adams 2001) A lecture that proposes the steps necessary for video games to achieve the cultural status as works of art. The lecture questions whether striving for achievement is compatible with art. Cited 8 times.

Appendix G: "Bad Game Designer, No Twinkie! III". (Adams 2002a) A *Designer's Notebook* column that introduces the concept of gameplay tension.

Appendix H: "Why We Shouldn't Make Games". (Adams 2002b) A lecture that discusses among other subjects the false analogy between dramatic tension and gameplay tension addressed in section 12.2, and proposes the compromise solution to the Problem of Internal Consistency discussed in section 6.3.

Appendix I: "Transmitting Meaning in Interactive Contexts". (Adams 2003a) This keynote address, delivered at the 3rd Conference on Computational Semiotics for Games and New Media, set out some of challenges that video games and interactive stories pose to semiotic analysis. I discuss this lecture in section 12.5.

Appendix J: "Interactivity Versus Narrative: This Time It's War!" (Adams 2003b) A general introductory lecture on interactive storytelling and the three problems for interactive storytellers.

Appendix K: "Postmodernism and the Three Types of Immersion". (Adams 2004a) A *Designer's Notebook* column that distinguishes between strategic, tactical, and narrative immersion. Cited 16 times.

Appendix L: "Dramatic Novelty in Games and Stories". (Adams 2004b) A Designer's Notebook column that identifies the overloading of the term *conflict* as a source of confusion in interactive story design, and the false analogy between dramatic tension and gameplay tension. I discuss these ideas in sections 12.1 and 12.2.

Appendix M: "Interactive Narratives Revisited: Ten Years of Research". (Adams 2005a) A wide-ranging lecture that addresses many of the topics in this thesis, showing how my thinking had changed since 1995, and considering some of the advances made by the video game industry. The lecture includes my resolution to the Problem of Amnesia, discussed in section 5.2. Cited 4 times.

Appendix N: "You Must Play *Façade*, Now!" (Adams 2005b) A *Designer's Notebook* column introducing the *Façade* interactive drama and noting that it avoids traditional game-like qualities.

Appendix O: "A New Vision for Interactive Stories". (Adams 2006a) The heart of the thesis, this lecture identifies the faulty analogies addressed in chapter 9, introduces the new schema for understanding the relationship between designer and player discussed in chapter 10, and shows how the schema resolves the Problems of Internal Consistency and Narrative flow, as explained in chapter 11.

Appendix P: "Introducing Ken Perlin's Law". (Adams 2006b) A Designer's Notebook column that proposes the idea of a credibility budget as

a means of managing the credibility of automatically generated stories. I address this idea further in section 12.3.

Appendix Q: "Rethinking Challenges in Games and Stories". (Adams 2007a) In this lecture I first proposed that designers should write requirements specifications for interactive story experiences before beginning to design the stories. This lecture was the basis for the template and guide to writing such specifications, which can be found in Appendix V.

Appendix R: "Why Design Documents Matter". (Adams 2007b) A *Designer's Notebook* column that justifies the effort of creating written game design documents.

Appendix S: "Bad Game Designer, No Twinkie! VIII". (Adams 2007c) A *Designer's Notebook* column that condemns creating avatar characters who are said to be suffering from amnesia as a means of resolving the Problem of Amnesia.

Appendix T: "Single-Player, Multiplayer, MMOG: Design Psychologies for Different Social Contexts". (Adams 2010a) A lecture that shows how the relationship between designer and player(s) varies substantially among single-player and different kinds of multiplayer games. I cite it in section 1.2.3 as part of my explanation why I do not consider multiplayer contexts in this thesis.

Appendix U: "Sandbox Storytelling". (Adams 2010b) A *Designer's Notebook* column discussing various considerations in telling stories in sandbox games. It also offers some scenarios that may be useful.

Appendix V: "A Template and Guide to Writing Requirements Specifications for Interactive Storytelling". (Adams 2011a) One of the primary achievements of this thesis, this document offers an approach to defining how an interactive story will work in a game and above all what the story will add to the player's experience.

3 Key Terms and Concepts

This thesis uses many terms of art, some from some from industry and some from the academic literature. It also refers to a number of software mechanisms commonly used by the video game industry to provide interactive storytelling. I do not have room here for a thorough examination of the subject, but more detailed discussion may be found in Chapter 7 of *Fundamentals of Game Design, Second Edition.* (Adams 2009)

3.1 Terms Used in This Thesis

Any modern scholar proposing to discuss stories and storytelling must be aware that he is walking into a minefield planted by numerous mutually-hostile antagonists. I am at least aware that the mines are there, and intend to pick my way among them gingerly indeed. This section explains my conventions and how I use some especially problematic terms.

3.1.1 *Player* and *Role-Playing*

The English language lacks a single unambiguous term to describe the role of a participant in an interactive story. *User* connotes functional rather than playful activities. *Interactor,* which Janet Murray and Marie-Laure Ryan use, (Murray 1997, Ryan 2003) is awkward, unfamiliar, and so neutral as to connote nothing at all. *Actors* enact roles upon a stage, but unless we specify that they are improvisational actors, the term suggests that the roles they play and the lines they deliver are devised by someone else, which is not always true in interactive stories. *Audience* implies passivity, or at least, an inability to modify or contribute to the content of the story.

In truth, the participant in an interactive story is actor, audience, and more (Hammond 2007). Like an actor, she extemporizes a role. Like an audience, she appreciates the experience for its story-like qualities. But above all, she *plays,* sometimes in the free, improvisational sense of the word (Callois's *paidia*) and sometimes in the sense of play constrained by rules (Callois's *ludus*). (Callois 2001, pp. 27–28)

No single English word incorporates all these ideas, but I have chosen to use *player* in this thesis for two reasons. Firstly, I want to maintain consistency with my other works cited here. Those works were all written for the video game industry, and they use *player.* Secondly, *player* means *one who play*s in both of Callois's senses, but it also means *actor* in Shakespeare's usage: "All the world's a stage, And all the men and women, meerely Players." (*As You Like It*, II viii) This overloading serves my purpose well, as the schema that I introduce in chapter 10 relies upon the participant's status as an improvisational actor, the player of a character.

The overloading of *role-playing,* unfortunately, is more troublesome than useful; but I must address it because it appears in my citations. *Role-playing* can refer to the actions of people in a certain kind of group therapy called psychodrama; to the activities of players in those games traditionally called "role-playing games" such as *Dungeons & Dragons* and its computerized counterparts*;* to the theatrical enactment or improvisation of a character on a stage; and doubtless there are other meanings as well. I certainly do not use the term in its therapeutic sense. When I write about role-playing and role-players, I mean both the improvisational dramatic sense and the game-playing sense. A player in an avatar-based interactive story enacts a character. He plays a role, so he is a role-player.

Game designer Jim Simmons recognized the value of role-playing as part of the player's activity in 1996:

> I believe that in the pursuit of interactive drama, we need to find ways of reducing the deconstructionist mental activities of game-playing and increasing the role-playing mental activities of the actor. Naturally, this implies less reliance on puzzle solving and action play mechanics, and creating intuitive forms of interacting with other characters. (Simmons 1996, p. 432)

The complex mechanics of games like *Dungeons & Dragons* have little to do with acting out a role, but they remain so firmly entrenched in the public mind as part of what *role-playing* means that I must explicitly disclaim them here. *Role-playing* in the sense in which I use it does not imply striving for character attribute growth through game mechanics. When I refer to such games, whether tabletop or computerized, I call them *conventional role-playing games.*

3.1.2 *Narrative* and *Interactive Narrative*

The term most fraught with difficulty is *narrative.* As J. Hillis Miller has observed, "…the recent decades of this century have seen a tremendous development of diverse theories of narrative, so many and so diverse that it makes the mind ache to think of them all." (Miller, 1990) Miller goes on to provide an extensive list of competing theories: Russian formalist, Chicago school, deconstructionism, and so on.

Scholars have proposed these theories as contributions to academic debates about the role of the author, how meaning is formed in the mind of the reader, and so on. However, I am concerned with the practical problems of creating well-formed interactive stories. For the purposes of this work I adopt what might called the naïve view. When I use the term *narrative,* it refers very specifically to *that which is narrated,* to presentational material in an interactive story which it is not in the power of the player to change—whether it be voice-over narration, scrolling text, an introductory movie or cut-scene, or any other non-interactive, presentational content supplied by the computer.

Jesper Juul, a noted ludologist, also endorses narrow constructions of *narrative*:

> The narrative turn of the last 20 years has seen the concept of narrative emerge as a privileged master concept in the description of all aspects of human society and sign-production. Expanding a concept can in many cases be useful, but the expansion process is also one that blurs boundaries and muddles concepts, be this desirable or not. With any sufficiently broad definition of *x*, everything will be *x*. This rapidly expands the possible uses of a theory but also brings the danger of exhaustion, the kind of exhaustion that eventually closes departments and feeds indifference: Having established that everything is *x*, there is nothing else to do than to repeat the statement. (Juul 2001)

The naïve view I take here renders the term *interactive narrative* an oxymoron, because that which is narrated cannot be interactive. I myself have used the term *interactive narrative* over the years, and it appears in many of my works cited in this thesis, but I now prefer the term *interactive storytelling* as less confusing. Further discussion of *interactive storytelling* may be found on page 31.

3.1.3 *Story* and *Plot*

The video game industry, which is where I have spent my career, does not have a uniform definition of *story* and *plot.* In this thesis I adopt a naïve approach to these terms as I did for *narrative*, but to explain it I must begin with a discussion of *events.* For my purposes an *event* is any change that the computer is capable of demonstrating to the player through its output devices. Games frequently generate events that the player never sees, as when something happens in a part of the game world that the screen is not currently displaying. Even unseen events can be meaningful to the player if they have consequences that the player becomes aware of later.

In the course of play, a player experiences three types of events: *narrated events* (immutable presentational material created by the designer); *computer-generated events* (mutable content that the software itself either created or modified prior to presentation), which might also be called *simulation events*; and *player-generated events* (content or observable behaviour that appears on the screen in response to player inputs). Figure 1 illustrates this idea. The white boxes marked P represent player-generated events, the grey ones marked C represent computer-generated events, and the black ones marked N represent narrated events. (The figure is somewhat compressed in time; normally narrative events occur less frequently.)

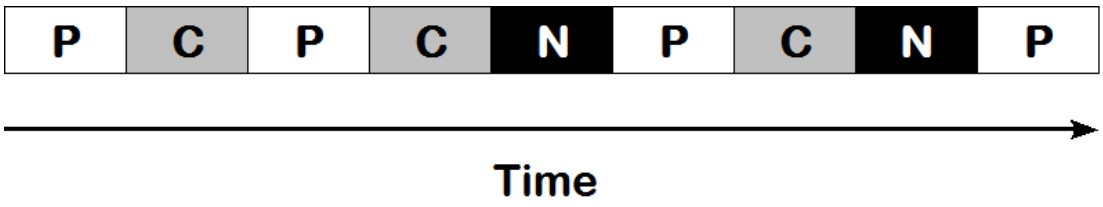

Figure 1: The player's experience of interactive storytelling events.

Note that a game need not include narrated events (the black boxes) if the storytelling occurs entirely via player- and computer-generated events.

In practice, a player may initiate two events simultaneously, such as running and jumping, and the computer may generate several computer-generated events that the

player becomes aware of simultaneously—as when multiple non-player characters are moving around on the screen, for example. However, the key point is that the player's experience of the events occurs sequentially in real time.

Storytellers generally include events in their stories for one of three reasons: to set the scene, to reveal character, or as part of the plot. For the purposes of this work, a *plot event* in a conventional story is an event that the viewer sees, or learns about after it has occurred, and that is dramatically significant. In interactive media, a plot event is a dramatically significant event that the player *might* experience or learn about, and it can take any of the forms described earlier—narrated, computer-generated, or player-generated. All the plot events in the work make up the plot, whether the work is conventional or interactive. Note that this definition of *plot* includes *all possible* plot events that a player may experience in a work, not just the ones that he experiences during a particular play-through of the work. An interactive work may contain many plot events that the player only become aware of if he plays through it more than once, and if some plot events are computer-generated, there can be an unlimited number of them. Most plots for commercial video games are predefined by the designer, however.

To be dramatically significant an event must contribute either to the creation or to the release of dramatic tension, and be related either by causality or by subject matter to most of the other events the viewer experiences.

An event may have a causal role and still be dramatically insignificant. For example, Jim telling his partner Susan that he is having an affair is dramatically significant; Jim turning his key to start his car engine before he drives away, as he always does, is not. Turning the key causes the engine to start, but it does not affect dramatic tension. Dramatically insignificant events are not plot events, but they may be included to reveal someone's character or set the scene. Presentational media usually elide some dramatically insignificant events to create a tighter narrative and a more compelling experience. Janet Murray calls this elision process *dramatic compression.* (Murray 2005)

Video games perform dramatic compression also, but the more accurately a game attempts to represent physical reality, the more insignificant events it must retain. In a highly realistic game, if the player does not turn the key in the ignition, the car will not move. The player is required to enact a dramatically insignificant event that most movies would not bother to show on the screen.

An event may be dramatically significant, even without a causal role, if it influences dramatic tension and is related by subject matter to the other events in the plot. Filmmakers of mystery or detective stories often keep the viewers guessing about whether events are causally-related to the crime (clues) or not (red herrings). A red herring is still a plot event because it influences dramatic tension and it plausibly appears to relate to the crime.

The viewer's sense of whether an event is dramatically significant is both subjective and a matter of context. One viewer's boring diversion is another's fascinating sidelight or subplot, and one viewer's complete *non sequitur* is another's brilliantly subtle plotting. Similarly, the context in which Jim turns his car key makes a difference. If the viewer knows that Susan has rigged a bomb in Jim's car to go off when he turns the key, then turning the key becomes significant indeed.

The subjective and context-dependent nature of the viewer's sense of what are and are not dramatically significant events makes it impossible to provide a universal rule to determine which events are part of the plot and which are extraneous. Any storyteller, whether of presentational or interactive stories, is obliged to rely on convention and common sense.

In an interactive work, plot events may be player-dependent or player-independent. A player-dependent plot event can only occur if the player performs it directly (e.g. the player befriends a lost child), or takes some other action that causes it to occur (e.g. the player opens a door, thus setting off a burglar alarm). Player-independent plot events occur for reasons unrelated to the player's activity. These may be triggered by the passage of time or by simulation results computed by the software, or they may simply be narrated before or after intervals of play.

In this thesis, the phrase *to advance the plot* means to cause the player to experience more plot events; if the player ceases to experience such events, the plot is said to have *stalled.* If the player deliberately causes the plot to stall, he *obstructs* the plot. I recognize that these usages are slightly problematic: A completely predefined plot is a static structure and cannot be said to "move". More literally correct formulations would be *advance the player's experience of the plot* and *obstruct the presentation of plot events*. However, I have rejected those as awkward and wordy, and trust that my reader accepts *advance the plot* and *obstruct the plot* as shorthand for them.

Despite these complexities, the definition of *story* that I use is a simple one; a story consists of all the events (both plot events and others) that the viewer or player can experience in the course of viewing or playing the work. If the player can play a game a second time and experience a sequence of events that differs from the one he experienced the first time, then the game contains a *manifold* story.

When a player plays through a manifold story, he experiences one possible manifestation of the plot—a *plot line.* If he plays it again, he may experience a different plot line. In some cases, the player may be able to influence the plot line, i.e. to exercise some control over the plot events that he experiences. Most video games that offer manifold stories do so by means of plots defined in advance by the designer (which I will call *predefined* plots), but there are other ways as well.

In an effort to avoid confusion, I have tried to provide as clear and rigorous a definition of *story, plot,* and *plot line* as I can. However, many of the authors whom I cite, and indeed my own older works, do not necessarily use these definitions, and some care is called for when reading them.

3.1.4 *Interactivity* and *Agency*

In general terms, *agency* refers to the power to effect change. Clint Hocking, a game designer on the *Splinter Cell* games, defines agency as "the satisfying power to take meaningful action and see the results of our decisions and choices." (Hocking 2004) For the purposes of this thesis, however, I use a narrower construction. In the context of interactive storytelling, *agency* refers specifically to the player's ability to influence the plot line, that is to cause the player to experience subsequent events

differently from the the way she would have experienced them if she acted in some other way, or if she chose not to act at all. In this thesis, *agency* means agency over the plot.

Michael Mateas points out that interactivity can provide experiences unrelated to the plot, such as the feeling of having developed a better understanding of the game world, further illustrating that interactivity and agency are not the same thing. (Mateas 2003a) However, Mateas characterizes agency as a feeling that the player gets, whereas I regard it as a quality of the interactive storytelling system itself: a degree of influence over the plot line. Andrew Stern likewise makes a distinction between *freedom,* which he characterizes as the number, range, and frequency of the player's choices, and agency, which he characterizes as "a meaningful, rewarding impact on the fiction". (Stern 2003b) He clearly means *freedom* to be a metric over interactivity, separate from agency. Brenda Laurel refers to the same idea as *interactive range*. (Laurel 1986, p. 107) I use the terms *freedom*, *interactive freedom*, *player freedom* and *interactive range* interchangeably; again, they do not imply agency.

It is common industry wisdom that players generally value freedom (as distinct from agency). Sweetser and Johnson tested this empirically through focus groups and player questionnaires, and found that the evidence supported this viewpoint. They also discovered that the more experienced a player is, the more he values freedom of expression in a game. (Sweetser 2004) As James Paul Gee observes: "The more and better a player can manipulate a character, the more the player invests in the game world. Good games offer characters that the player can move intricately, effectively, and easily through the world. Beyond characters, good games offer the player intricate, effective, and easy manipulation of the world's objects, objects which become tools for carrying out the player's goals." (Gee 2004)

In the 1990s, industry professionals discussing players' experience with interactive storytelling software rarely made any distinction between interactivity and agency; in fact, the term *agency* was not in common use. (See for example Adams "Challenge" 1995; Crawford 1996a.) At that time, both terms could be used to refer to the player's

ability to influence the plot line of an interactive story. This is something to bear in mind when reading quotations from my older works.

As the field developed, the terminology became more specific. The term *interactivity* now refers to the player's ability to interact with any software, regardless of whether any story is involved, and it does not necessarily imply agency.

By treating interactivity as if it were the same as agency in my early works, I concluded that if a player had no agency, he had no interactivity either, and asserted that this was unacceptable in an interactive medium. But as they are not the same, it is perfectly possible to give players interactivity—that is, things to do that affect the game world—without any agency that affects the plot line. *Sonic the Hedgehog* (1991) offers a great deal of interactivity, but no agency. No matter what the player does in the present, it has no effect on future events of the story.

3.1.5 *Interactive Storytelling*

Interactive storytelling is second only to *narrative* as the subject of vigorous debate both within the video game industry and the academy. (Adams & Rollings 2006c, p. 183) In *Fundamentals of Game Design*, an introductory textbook, I offered this definition:

> An interactive story is a story that the player interacts with by contributing actions to it. A story may be interactive even if the player's actions cannot change the direction of the plot.[1] (Adams & Rollings 2006c, p. 187)

This definition may initially seem counterintuitive. However, once the distinction between *interactivity* and *agency* is properly understood (as discussed above), it should be clear. Interactivity does not imply agency, and an interactive story can be interactive without offering agency. I went on to assert that "a player will still feel as if he is interacting with a story even if his actions do not change future events." (Adams & Rollings 2006c, p. 187)

It follows from the foregoing that *interactive storytelling* is a systematic process that makes the player feel as if he is immersed in and contributing to a story—that he is

1 Here is an example of the variety of usages for *plot* that I described in section 3.1.3. Had *Fundamentals of Game Design* been written using the terminology of this thesis, this would have read "change the direction of the plot line."

having a story-like experience. (I discuss the definition of *story-like* in the next section.) In the widest sense of the term, a parent who invents and tells a story to a child in real time, and incorporates the child's interjections into the parent's account, performs interactive storytelling with the child. In the context of this thesis, computer software and the player's own contributions generate the player's experience. The story designer specifies the software and the data that produce the computer's contribution—which, for the remainder of this thesis, I regard as the designer's contribution.

I have intentionally chosen a broad, yet specific, definition of *interactive storytelling.* I do not seek to turn the idea into the sort of privileged master concept that Jesper Juul complained about with respect to *narrative* (Juul 2001). I do not assert that *interactive storytelling* applies to all forms of fictive human-computer interaction. Computer chess does not perform interactive storytelling, because a game of chess is not a story. Watching a video recording of a story that the viewer can pause, reverse, and jump forward through is not interactive storytelling, because the viewer cannot contribute actions to the story itself. Nor, for the same reason, is navigating through static hypertext. Yet I do not constrain *interactive storytelling* to refer only to manifold stories or only to systems that procedurally generate plots, as some have done. As a designer myself I am chiefly concerned with industrial practice, and I have little sympathy for analyses that propose to resolve the problems of interactive storytelling, but do so by excluding many industry-standard techniques from their definition of the term. My object, from 1995 to the present, has been to address issues that face practitioners every day. In this thesis I do not consider multipresent interaction models (see section 1.2.2) and multiplayer contexts (section 1.2.3) not because I exclude them from the domain of interactive storytelling—I emphatically do not—but only because my work has not addressed interactive stories of those kinds.

I prefer this broad view of what *interactive storytelling* means for pedagogical reasons as well as theoretical ones. Students wish to include stories in the games they build, in a variety of different ways. Rather than get bogged down in classroom debates about what is and is not interactive storytelling, it is easier to use an inclusive

definition and then discuss various *types* of interactive storytelling and methods for implementing them. In a sense this simply pushes the debate to a different level, but it pre-empts the arguments that invariably occur when a teacher tells a student that what the student is planning to do isn't "real" or "true" interactive storytelling.

3.1.6 *Interactive Drama*

Brenda Laurel is credited with devising the term *interactive drama.* (Laurel 1986) A search of industry publications reveals that it is seldom used in commercial game development, although there are exceptions, e.g. Jim Simmons in "If Aristotle Could Only See Us Now". (Simmons 1996, p. 432) Laurel was describing computer-mediated experiences, but the term is also used in the educational field to refer to live performances by human actors in which part or all of the audience is invited to participate in some fashion. (Crowshoe 2005; Boggs 2007)

In researching the academic literature on computer-mediated interactive drama, I find a variety of definitions. Laurel's original definition reads,

> An "interactive drama," then, is a first-person experience within a fantasy world, in which the user may create, enact, and observe a character whose choices and actions affect the course of events, just as they might in a play. (Laurel 1986, pp. 10–11)

Laurel founded her expectations on what drama, interactive or otherwise, should be like on Aristotle's *Poetics*. Nicholas Szilas has asserted that drama requires direct representation, i.e. that books are not drama because the story is represented through text, whereas films, live theatre, and computer games are. As a result, his formulation excludes text-based experiences. Szilas goes on to state that interactive drama is the "specific kind of drama where the audience can modify the course of actions in the drama, thus having an active role." (Szilas 1999) Arinbjarnar *et al.* give what appears initially to be a broader definition in "A Critical Review of Interactive Drama Systems":

> An interactive drama takes place within a virtual world in which the user has a high degree of freedom to physically and mentally interact with non-player characters and objects within a dramatically interesting experience which is different on every play and adapts to users interactions. (Arinbjarnar 2009, p. 16)

However, through their requirement that the experience be different on every play, they explicitly reject linear or multilinear plot structures (i.e. branching or foldback structures—see sections 3.3.1.2 and 3.3.1.3 for definitions of these terms) as sufficiently interactive for their definition. (Arinbjarnar 2009, p. 15)

Like Brenda Laurel, Michael Mateas relies on Aristotle for his understanding of what *drama* means, and distinguishes between drama and narrative storytelling:

> Dramatic (Aristotelian) stories are distinguished from narrative stories by the following properties:
>
> - Enactment vs. Description
> - Intensification vs. Extensification
> - Unity of Action vs. Episodic Structure (Mateas 2004a)
>
> Certainly not all interactive story experiences must have the properties of Aristotelian drama. In fact, most interactive story experiences built to date have either been highly episodic (generally those narrative experiences built by the game industry, e.g. adventure games), have employed a hypertextual logic of association rather than a logic of dramatic probability and causality (generally those experiences built by fine artists and writers), or have focused on story not as a highly structured experience created by an author for consumption by an audience, but rather as a shared social construction facilitating human communication. (Mateas 2004a)

Like me, Mateas uses a broad definition of *interactive storytelling.* He describes interactive drama as one particular kind of interactive storytelling, differentiated from other kinds by properties that make the experience more like playing a role on the stage and less like playing a role in a novel. I have not used the term *interactive drama* much in my own work, but I find his formulation compelling, and it is the one I use in this thesis.

3.1.7 *Story-Like*

What makes an interactive experience story-like? Opinions among players and designers vary, but I propose that an interactive experience is more story-like if it has more of the following characteristics:

- The designer's own contribution—the part of the experience that the software supplies—maintains plot, character, and world consistency throughout.

- The experience preserves credibility throughout, at least in the context of its own inner laws. Credibility is an elastic value, and different players will tolerate different amounts of absurdity in a story before it loses credibility for them, but there must be some limit beyond which the experiences ceases to be story-like. I discuss the concept of a credibility budget for interactive stories in section 12.3.

- The player derives significant entertainment through role-playing a character and interacting with the plot. (I do not exclude multipresent interaction models, but I believe that a multipresent interaction model makes the experience less story-like than an avatar-based model does.)

- Plot events occur at a rate sufficient to sustain dramatic tension and keep the player engaged with the story.

- The experience includes few or no random or repetitive events. See section 12.2.2 for further discussion of this idea.

- Dialogue and interactions among the simulated and player characters usually (but not always) play a large role. In rare cases interactive stories can be about a single individual.

As mentioned earlier, creative writers normally consider that the material in stories should serve one of three purposes: to set the scene, to reveal character, or to advance the plot. No firm rule exists to dictate the proportions in which these three types of content should appear, however, and video games have tended to concentrate on plot because players expect it.

3.2 Avatar Specificity

In all storytelling media, fictional characters may be described, or specified, to any degree of detail for which the author has time and resources. A character who is only seen for a moment, such as a street vendor, may be specified very briefly—“a middle-aged Chinese man in a New York Yankees jacket”, for example. Protagonists, however, are usually specified in much greater detail, and indeed sometimes the character of the protagonist is the subject of the entire work.

Video games are peculiar in that their avatar characters, which serve—in games with stories—as the protagonist, may or may not be specified closely. In early games such as *Adventure* and *Zork*, the avatar character was not specified at all because the designers wanted the player to pretend that he himself, or she herself, was the protagonist of the game. This approach was not limited to the early text adventures, however. Gordon Freeman, the protagonist in the *Half-Life* series, is also almost completely unspecified. The player never sees Gordon (the game uses a first-person perspective exclusively and the game world contains no mirrors) and Gordon never speaks. The only real details the player knows about him are his name, his sex, and his job (he is a scientist). The nameless thug who is the player's avatar in *Grand Theft Auto III* (2001) has a physical appearance, but also never speaks. Lara Croft from the *Tomb Raider* series is more specific, but she seldom speaks enough to give a real sense of her personality. She has a personal history, but it has little influence on her adventures. Max Payne from *Max Payne* (2001) and April Ryan from *The Longest Journey* (1999) are at the other end of the scale. When the player takes control of them, these characters already have histories, personalities, and relationships that influence the subsequent story. Both games prevent the player from introducing inconsistencies simply by offering the player no actions that will enable them to do so. *Fundamentals of Game Design, Second Edition* addresses this further in the section "Specific and Nonspecific Avatars". (Adams 2009, pp. 130-131)

In conventional role-playing games, whether computerized or not, the player rather than the designer specifies the avatar before the game begins, often in great detail: build; species; clothing; hair, skin, and eye colours; and so on. In these games, the player enacts the avatar as he or she sees fit, so every action the player takes in the game is necessarily in character—the character of the avatar is the player's to define.

3.3 Storytelling Mechanisms

This section introduces a variety of plot structures and mechanisms that the video game industry uses, or hopes to use, for interactive storytelling. They are not the only ones possible by any means, but I refer to these in particular throughout the thesis.

3.3.1 Plot Structures

The video game industry has developed a variety of ways in which to structure interactive storytelling plots. Note that in the industrial literature the terms *plot* and *story* are sometimes used interchangeably; a linear plot can mean the same thing as a linear story.

3.3.1.1 Linear Plots

A linear plot contains one immutable sequence of plot events. The player has no agency. Players still feel as if they contribute to the story by enacting their avatar. The plot events often cannot occur until the player has overcome a challenge or performed some action (these plot events are said to be *player-dependent*). If the player fails to perform a required task, the plot stalls.

Linear plots are predefined by the designer and each can have only one ending. They are most commonly found in action games and in games that offer a linear sequence of missions, such as strategy games, in which the plot events only occur between missions and not during play.

3.3.1.2 Branching Plots

A branching plot is constructed as a directed acyclic graph in which the vertices usually (but not always) represent decision points and each edge represents one or more plot events. The software navigates the plot by starting at a pre-selected vertex (the source, in graph theory) and traversing the graph along the edges, presenting the plot events that each edge represents, until it reaches a final vertex from which no edges depart (the sink), which is the end of the story. The player experiences the plot events in a sequence that may vary from one playing to the next (the plot line), depending on what happens at the decision points. In conventional terminology we say that the plot branches at these points. Normally the player's actions influence most of the decisions: the plot may branch based upon choices the player makes or upon his ability to meet challenges. (See section 12.4 for a discussion of the emotional consequences attending branching based on choices versus branching based on challenges.) If the player may influence a decision, he has agency over the plot. Plot branch decisions may be based upon other factors as well, however, including the action of chance. If multiple edges come into a vertex and only one

edge leaves, no decision takes place there; in that circumstance two or more possible plot lines converge into one. Note that the graph must be acyclic or the player might experience the same plot event twice. I discuss the strengths and weaknesses of branching plots at some length in *Fundamentals of Game Design, Second Edition.* (Adams 2009, pp. 171–173)

As with linear plots, branching plots are predefined by the designer, and they may have more than one ending. In storytelling systems with branching plots, the player's agency does not extend to redefining the structure of the graph.

3.3.1.3 Foldback Plots

A foldback plot (also sometimes called a multilinear plot) is a branching plot in which all possible plot lines converge from time to time to a single edge. The edge represents one or more inevitable events—plot events that the player cannot avoid. Inevitable events tend to be ones that the player cannot reasonably expect to have agency over; e.g. in a game in which the player enacts the role of an Allied soldier in the Second World War, the bombing of Pearl Harbor or the German invasion of the Soviet Union would be inevitable events. See Figure 2 for a simplified schematic example.

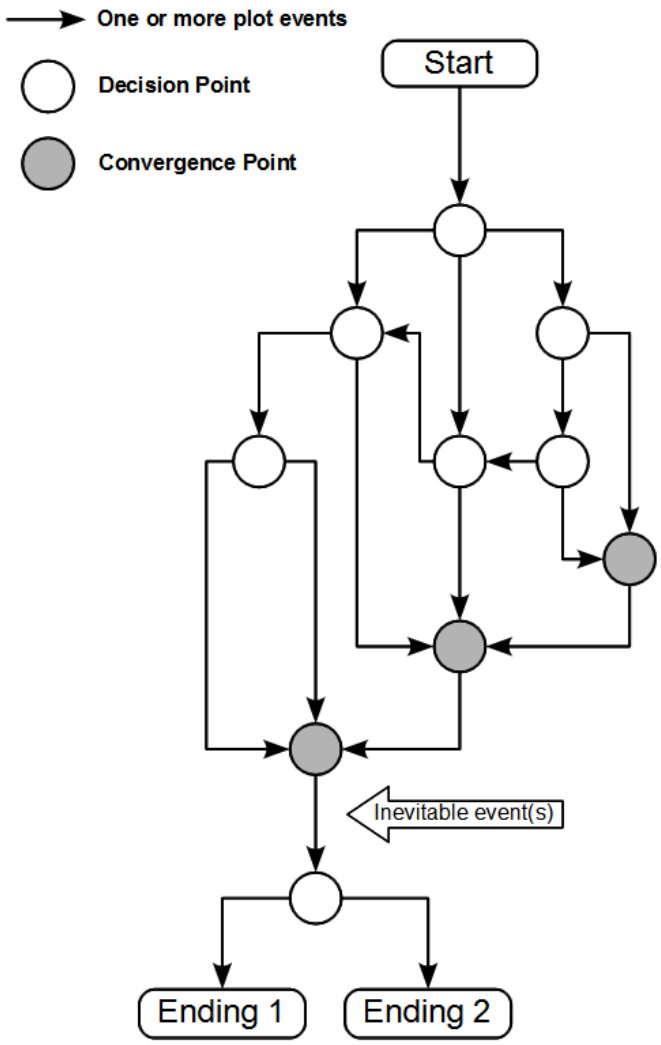

Figure 2: A simplified foldback plot.

Foldback plots are predefined by the designer and may have one or more endings. Most adventure games are structured as foldback stories. The inclusion of inevitable events reduces player agency overall, but makes the player feel as if he is participating in a larger sweep of events, of which he is only a part. (Adams 2009, pp. 173–175)

3.3.1.4 Main Plot With Subplots

The acyclic graph structure of a branching or foldback plot means that when a player rejects one plot line in favour of another at a decision point, the first one is permanently closed off. Many conventional computer role-playing games, however,

offer a player a choice of quests; when they have finished one quest they may return and choose another, but the one they chose first is no longer available. (Adams 2009, p. 458) Such a game cannot be represented by a directed acyclic graph. These stories typically include one main plot, and a number of subplots (the optional quests). The subplots may themselves be represented as directed acyclic graphs that depart from the main story and return to it again. A peculiarity of these subplots is that the player may usually abandon them and return to the main plot line at almost any moment. In these games the player has a great deal of freedom to choose subplots, a degree of agency over the his current subplot, and comparatively little agency over the main plot. These kinds of plots are predefined by the designer and can, but seldom do, have more than one ending.

3.3.1.5 Procedurally Generated (Emergent) Plots

The mechanisms discussed above treat interactive storytelling very much as a designer-driven process. Because the plots are structured as graphs from which the player cannot escape, these stories often contain a good deal of narrative content. A procedurally generated (also sometimes called *emergent*) plot is a different sort of animal entirely; it does not have a graph structure. The story emerges from the player's interaction with the virtual world and characters, which are typically simulated to a much greater level of detail than in the mechanisms already described. The sequence of plot events that the player experiences cannot be entirely predicted in advance, and depends on the exact nature of the simulation. These interactive stories can offer a great deal of interactive range, and the player's agency is not confined to the decision points in a graph. Conceivably, everything the player does may influence the plot.

Few commercial video games offer emergent stories; for the moment emergent storytelling is largely a research issue. A popular approach in the academic community has been to create a *drama manager,* an automated system that attempts to devise (or revise) a satisfactory plot in real time while the player plays. In 2008, David Roberts and Charles Isbell published an extensive review of different approaches to building drama managers. Common to all are "a set of plot points; a set of drama manager actions that can be taken in the game world; a model of player

responses to DM actions; and a model of the author's intent." (Roberts 2008) (Their *plot points* are equivalent to my *plot events.*) Roberts and Isbell divided drama management approaches into:

- Optimization-based systems, in which authorial intent is expressed as an evaluation function. These approaches make use of traditional AI search techniques and statistical machine learning to choose the most desirable course of action.

- Planning-based architectures, of which an early example is Young *et al.*'s MIMESIS. (Young 2003) Barber and Kudenko's GADIN also makes use of a classic STRIPS-style planner (Barber 2007), as does the BOVARY system (Cavazza 2007).

- Other approaches, including among them Mateas and Stern's beat-based drama manager used in *Façade* (Mateas 2007) and the case-based reasoning in OPIATE (Fairclough 2006) and others.

I cannot discuss the strengths and weaknesses of all these different projects here, but Roberts and Isbell analysed each in terms of a number of desiderata for interactive drama, among them the degree of authorial control the system offers and the level of player autonomy it permits.

Emergent stories are not without their own problems, which I cannot address here; see *Fundamentals of Game Design, Second Edition.* (Adams 2009, p. 175)

3.3.1.6 Hybrid Systems

In "A New Vision for Interactive Stories" (Adams 2006a) I described a nearly unique game called *King of Dragon Pass* (2000) that maintained a database of software scripts (functions, in programming terms) and a database of simulated characters. Each script represented a particular hypothetical dramatic situation, but it did not contain any information about the characters in the database. (Some non-player characters who were seldom seen were not in the database, however, and their attributes were hard-coded into the scripts.) The game generated plot events for the player to experience by simulating interactions among the characters according to the

scripts. When the storytelling engine executed a script, it would pass one or more of the characters from the character database to the script as parameters. The script examined the attributes of the characters and generated plot events consistent with the characters' personalities. The player exercised agency by choosing characters to take part in particular situations. If the player replayed the game, he might choose different characters and so experience different plot events. So, for example, a script could represent a diplomatic negotiation, but the outcome—the resulting plot event—would vary depending on which characters engaged in the diplomacy. Some scripts triggered others in a causal chain; scripts were also triggered by the core mechanics of the game as a consequence of internal computations.

King of Dragon Pass did not employ a true procedural plot generator because some of the causal chains between the scripts were hand-coded by the author rather than computed. In fact it was a hybrid, combining narration and conventional authorial plotting with computed plot advancement. It did not make use of a drama manager that searches through possible futures, nor an evaluation function that attempts to select an interesting plot line. *King of Dragon Pass* also would not qualify as an interactive drama under most definitions because it used a multipresent rather than an avatar-based interaction model, but the storytelling system did not preclude avatar-based models.

3.3.1.7 Conclusion on Plot Structures

The foregoing approaches are by no means mutually exclusive; they can and have been combined in various ways. In the history of the game industry, the linear, foldback and plot-with-subplots structures have been the most commonly used.

3.3.2 Mechanisms for Advancing the Plot

For a player to sense that he is moving through the plot of a story, he must experience plot events at a rate sufficient to sustain dramatic tension and his engagement with the story. In presentational storytelling media, these events occur at intervals established by the author. The viewer experiences the events as he watches the story. In interactive media, however, the pace may be influenced by the player.

In the next few sections I will describe some of the mechanisms the designer may choose as a means to advance the plot. Note that the mechanism for advancing the

plot is entirely independent of the structure of the plot. The plot may be predefined, procedurally generated, or a hybrid; if predefined, it may be linear, branching, or foldback.

3.3.2.1 Plot Events Triggered by Avatar Exploration

In this approach, the designer creates a game world as a simulated space, and gives the player an avatar within that space. The designer specifies points throughout the space at which the software will detect the presence of the avatar and stimulate the storytelling engine to present a plot event. The player experiences the story as she explores the space—as a journey. These software detection points usually operate only once, so if the player goes back through the game world the way she came, she does not experience the events again; that would create an absurdity. All plot events triggered in this way are player-dependent plot events; they do not occur unless and until the player moves into the area.

This mechanism works particularly well for the Hero's Journey story form, the standard approach for the adventure game and action/adventure game genres. In these games, for the most part the avatar is expected to move onward rather than backward, and such games often include one-way doors that prevent the player from going backward at all.

3.3.2.2 Plot Events Triggered by Player Decisions or Achievements

In this mechanism plot events are triggered by actions the player may take—usually, actions that make decisions or choices, or actions intended to overcome a challenge. These plot events are player-dependent. Unlike the preceding mechanism, travel itself is not necessarily dramatically significant.

Interstate '76 (1997), a driving/shooting game, serves as a useful example of this mechanism. The player spends a great deal of time driving around a large region, but the act of driving does not in itself advance the plot. Successfully destroying enemy cars advances the plot.

3.3.2.3 The Passage of Real Time

In these kinds of games the storytelling engine runs continuously, and plot events take place whether the player acts or not. If the story contains a predefined plot, this

usually means that the game has a fixed maximum duration because the player does not control its pace. *Night Trap* (1992) was an early example of such a game. *Night Trap* was designed for a unique (and never released) interactive videotape console that read special tapes with four parallel video tracks. The game told a story by streaming video from one track from the tape to the player's screen, and the player could take actions that caused the console to switch from track to track, showing different video depending on the decisions he made. When the tape reached the end, the game necessarily ended also. Every game took place in real time and lasted a fixed amount of time. The player had the power to perform player-dependent plot events, but if he did not, player-independent plot events would occur instead.

Night Trap was eventually released on the Sega Genesis (Mega Drive) console with a CD player accessory. *Psychic Detective* (1995) and *Façade* (2005) also told their stories in real time; however, the pace of *Façade* was not as strictly fixed as that of *Night Trap*.

3.3.2.4 Combined Mechanisms

As with the various plot structures described above, it is entirely possible to develop interactive stories that combine different plot advancement mechanisms. For example, the plots of most shooter games combine avatar-movement triggered plot events with a few plot events triggered by the passage of real time, such as a time-limited mission. Problems sometimes arise when using a single mechanism that could be solved by combining them. I address this further in chapter 7, The Problem of Narrative Flow.

4 “The Challenge of the Interactive Movie”

My work on interactive storytelling began with a lecture that I gave at the Computer Game Developers’ Conference in 1995, titled “The Challenge of the Interactive Movie”. (Adams 1995) At that time, the recent invention of video compression technology and the CD-ROM had generated a great deal of interest in video games among professionals from film and television. I was concerned about the potential impact of a large influx of filmmakers to the interactive entertainment industry. It seemed likely that they would bring with them the methods and expectations of the presentational media, and that they would fail to understand the nature of interactive entertainment, which would in turn result in many cancelled projects and job losses. One of my goals for the lecture was to educate these people about some of the challenges that computer game designers face in creating interactive stories.

I began by examining several products labelled as interactive movies to see what they had in common, but I observed that they were so diverse that I could not draw any useful conclusions from them. Abandoning an empirical approach, I then took as a working hypothesis (without stating so explicitly) that an interactive movie would be a single-player interactive storytelling video game in which the player takes the role of the protagonist in the story, i.e. controls an avatar character. Starting from this basis, the lecture identified three major design problems associated with interactive storytelling:

- **The Problem of Amnesia,** which refers to a situation that occurs when the player plays the role of a character in the story, yet the player knows nothing about the story’s world when he begins the game. The avatar should know the fictional world in which she lives, but the player has amnesia with respect to the world.

- **The Problem of Internal Consistency,** which refers to the difficulty of providing an internally consistent story experience, given that the player might choose to act in ways that are inconsistent with the designer’s intentions for the story, world, and avatar character.

- **The Problem of Narrative Flow**, which refers to a question of how the designer is to prevent the player from obstructing the plot, and how the designer can ensure that when it is time for the dramatic climax to take place in her interactive story, her player is in the right place and ready for it.

I then went on to identify an issue that underlies both the Problem of Internal Consistency and the Problem of Narrative Flow, although I did not state the connection during the lecture:

- **The Tension Between Player Freedom and Well-Formed Stories.** This refers to the fact that the more control the designer exercises over the game in an effort to guarantee a well-formed story and a satisfactory flow of the plot line towards the dramatic climax, the less freedom, or interactive range, he can give the player. The more freedom the player has to do as he chooses, the less power the designer has to guarantee a well-formed story.

Having introduced these ideas, I argued that they were not really problems to be solved after all; that in fact they could not be solved. Rather, they were "fundamental characteristics of the nature of the different media", by which I meant that they arise out of an inescapable conflict between certain essential properties of stories and of computer interaction.

The remainder of the lecture was a plea to designers (aimed primarily at any filmmakers in the audience) not to subordinate interaction to storytelling. I asserted that interactivity should dominate. Towards the end of the lecture I said, "…you [designers] can borrow a lot of things from the movies… but you cannot borrow plot. Plot is not yours to control. The plot is what the player is supposed to be doing." I ended the lecture with the firm assertion, "Your job is not to *tell* stories; your job is to build worlds in which stories can happen."

I was later to reprise these ideas in an article entitled "Three Problems for Interactive Storytellers". (Adams 1999) Although I had described the three problems as impossible to solve, I continued to think about them over the course of my career, and have since reached different conclusions from those I described in the lecture. This thesis discusses the progress of my research, contrasts it with the work of other

scholars and practitioners, and introduces a better schema for thinking about, and practising, interactive storytelling design. The new schema, based upon the player's status as a role-player, resolves the problems described above.

5 The Problem of Amnesia

5.1 Original Statement of the Problem

In “The Challenge of the Interactive Movie” I noted that, unlike the characters in a conventional narrative story, the player who plays a role in an interactive story does not come from or belong to the world that she enters, and so has to spend some time familiarizing herself with it (assuming that the game gives her the opportunity). I wrote,

> ...the characters *in* a story belong in their world. They know what’s going on in their world, they’re part of their world... they don’t get up and wander around their apartment opening all the drawers to see what’s in them; they don’t have to wander all over town to see what’s there. (Adams 1995)

The player, by contrast, is unfamiliar with the world in which she is expected to play a role:

> The player in interactive entertainment has *no idea what is going on*! They have amnesia. The first thing they have to do is do all this exploration. (Adams 1995)

In many cases the player’s ignorance of the game world does not matter, because she is provided with so little interactive range (e.g. in a shooter game) or such a linear space to explore (e.g. in a side-scrolling game) that she must simply take the game as it comes. In large open-world games, however, the player must do a great deal of exploration to learn about the new environment in which she finds herself. This makes sense if the player’s role is that of an explorer, but in a game that begins in the avatar’s home or office, it is absurd for the player to have to start the game by exploring a space that her character is supposed to know well. Many adventure games exhibit this problem.

In the lecture I observed that the game industry uses two common approaches to dealing with the Problem of Amnesia, neither very satisfactory. The first approach is to give the player control of an avatar who himself has amnesia. Several such games have been created, most notably one simply named *Amnesia* (1986). However, this is clearly an unrealistic constraint; we cannot limit our stories to those in which the protagonist is suffering from memory loss. Since the original lecture, various

commentators have objected to the use of a protagonist with amnesia as a plot device (Gaynor 2005, Sharkey 2010); they find it trite and artificial. I myself listed it as a grievous design error in “Bad Game Designer, No Twinkie! VIII” (Adams 2007c).

In the other approach, the designer creates a story in which the avatar finds himself in an unfamiliar situation and so is just as uncertain about the world as the player is. I suggested that two such genres of literature were the mystery, or detective story, and the heroic quest. Many games adopt the heroic quest as their story structure, with a protagonist unfamiliar with the world that he enters: the newly-recruited soldier, for example. However, this approach does not solve the problem for stories that take place in a world with which the avatar is supposed to be completely familiar and comfortable. Just as we do not wish to constrain designers only to create interactive stories about protagonists with amnesia, we also do not wish to constrain them only to create mysteries and heroic quests.

5.2 Critique and Resolution

The Problem of Amnesia arises because the participant in an avatar-based game performs as actor, audience, and player all at once, as I demonstrated in section 3.1.1. The video game industry, at least, has failed to come to grips with the tripartite nature of these activities. An actor is expected to be entirely familiar with his role and the world he will inhabit before he takes the stage; the audience is permitted (if not expected) to be entirely ignorant when it walks into the theatre. A player should know the rules of the game, but little else.

Ten years after “The Challenge of the Interactive Movie” (Adams 1995) I gave another lecture at the Game Developers’ Conference called “Interactive Narratives Revisited: Ten Years of Research”. (Adams 2005a) In this lecture I addressed the Problem of Amnesia again, and concluded that while it is true that the protagonist in conventional stories usually belongs in the story’s world (with exceptions for detective stories and heroic quests), the audience still needs an introduction. I observed:

> Really well-crafted novels or movies have very subtle introductions in which the introductory material is so cleverly woven into the plot that you don’t

> notice that you are being introduced to the characters and situations. We have to learn how to craft better introductions. (Adams 2005a)

It is worth pointing out that the problem of introducing the audience to the world and characters of the story goes back to the ancient Greeks; this was the one of the functions of the chorus. Even today, playgoers receive a program that tells them the names of the characters and the setting of the play. Most modern films do neither, relying on subtle references that the audience is expected to pick up, but for really unfamiliar situations (e.g. *Casablanca*), they may offer voiceover narration, text, or both.

The Problem of Amnesia, then, exists not because of an intrinsic problem with interactive media that conventional storytelling does not have; rather, it arises because many games treat the player primarily as an actor, not as an audience, leaving her to flounder around and figure out things as best she can. The problem occurs chiefly in those games that dump the player *in medias res* without a well-crafted introduction.

Some video games address the issue by providing non-interactive sequences before gameplay begins, which tell the player explicitly what to expect. These can take as long as twenty minutes in extreme cases (*Ōkami* 2006). Others include expository speeches from mentor characters, delivered to the player early in the game (*Planescape: Torment* 1999, *Banjo-Kazooie* 1998). Older video games came supplied with a manual full of background information, and expected the player to read it before beginning to play. However, I concluded that,

> Dumping a lot of expository material on the reader or the player is bad practice in any medium… I think if we spent more time crafting good introductions, rather than just treating it as a nuisance to be dealt with shortly before shipping the game, we wouldn't have such a problem with player amnesia. (Adams 2005a)

In short, solving the Problem of Amnesia is largely a question of craftsmanship. Although film and other non-interactive forms of storytelling don't have exactly the same problem, they still must introduce the characters and situation to the audience. In "Bad Game Designer, No Twinkie! VIII" (Adams 2007c) I included an exchange

of dialogue from a television show that provides the audience with a great deal of information about the characters and their relationships in only four lines. None of the dialogue is explicitly expository—its function is to set up a scene later. Many games begin with tutorial levels that introduce the player to the user interface of the game, but few of them use it as an opportunity to provide a subtle introduction to the avatar's character or the game world.

6 The Problem of Internal Consistency

The Problem of Internal Consistency refers to a dilemma that the designer faces: how to provide a consistent, well-formed story experience to the player if the player has great freedom of action? Three possible ways in which a player may render the experience incoherent are:

1. **Violating the plot.** The player may perform actions inconsistent with predefined plot events that she experiences later—actions that cause an absurdity when she does experience the later events. For example, if the player has the capacity to kill a character who is required by future events in her plot line, this would violate the plot. The character would appear during the later event, when the player knows him to be dead.

2. **Violating character.** The player controls an avatar character with defined personality traits, yet chooses to act in ways inconsistent with the definition —that is, she acts out of character. Henry Jenkins neatly summarized this in the epigram “Player freedom annihilates character.” (Jenkins 2001)

3. **Violating the game world.** The player introduces to the game world (possibly by mentioning them in speech) ideas that do not belong there, e.g. referring to the Apollo moon landings in a game set in the 1920s.

Brenda Laurel referred to the last of these in her proposal for an interactive drama system in her PhD thesis:

> Preventing the user from introducing new potential is essential to the functioning of the system, especially in the creation and maintenance of dramatic probability. The playwriting expert system, which possesses story generation and story understanding capabilities as well as playwriting expertise, cannot be expected to function if the materials it receives from the user are unknown in the fantasy world context, or if they are in conflict with the “laws of the universe” that are part of that context. (Laurel 1986, p. 103)

The greater the range of choices and actions available to the player, the more likely one of these will happen.

6.1 Original Statement of the Problem

In “The Challenge of the Interactive Movie” I introduced the Problem of Internal Consistency this way:

> There’s a sort of fundamental judgment that we make about all [stories], and that is: If you walk out of a movie, having seen it—or if you put down a book, having read it—and you say to yourself, “I don’t think he would have done that” or “I don’t think she would have reacted to that situation in that way,” then we say that that story has a flaw. There’s something wrong with it; it doesn’t make sense. Essentially, what this means is that any story has got to be true to its own inner laws. It has to be coherent. It has to be credible. And at any point in the story, the conditions that obtain at that point in the story have got to be rationally derivable from everything that went beforehand. I don’t mean to make it sound like this is a strictly logical deduction, but it’s a question of it hanging together in a single coherent way…
>
> As you’re watching the movie [*Casablanca*], you still don’t know what’s going to happen. It’s not as if the movie is predictable. But when it’s done, the movie is satisfying. We agree that it makes sense. And that’s the kind of thing I’m talking about with this business of internal coherency.
>
> So what does all this have to do with interactivity? The answer is, *nothing*. Interactivity is about freedom. Interactivity is about giving your player things to do and letting your player do them. The whole point of interactive media is letting the player do something on his own. What that means is that a lot of times your player is gonna jump off the rails and go off and do completely weird, unanticipated stuff. That theory doesn’t work very well with stories…
>
> Superman is a character who is congenitally incapable of ignoring a baby who’s crying in a burning building... [Suppose] I’m being Superman in some sort of interactive game or an interactive movie. Here’s the burning building. Do I run in and save the baby? Well, I have to if I’m Superman, but if I don’t do it, then I’ve violated Superman’s basic nature. There’s this problem that arises, where the player may not be terribly interested in what *you* think is supposed to be *your* plot for them, or they may have something else that they want to do that doesn’t fit. It’s a tough one. How do you make sure that the player is going to do something that is coherent, that goes along with *your* plot, the thing that you have designed for them? (Adams 1995)

Many commentators have referred to the problem since, although few have used my terminology exactly. Janet Murray uses the term *satisfying story* to refer to one that meets the audience’s requirements for coherency. (Murray 1997, p. 202). Andrew Stern and Marie-Laure Ryan prefer the term *well-formed story,* which, in retrospect, I now prefer also. (Stern 2003b, Ryan 2003, pp. 256-7).

The easiest way for a player to destroy the internal consistency of a story is through language: by speaking about subjects that are inconsistent with the world. The designer can, of course limit what the player may say, but that comes with its own problems, as Murray observes:

> One of the chief stumbling blocks to mature digital storytelling is the difficulty of establishing expressive conventions for the interactor's use of language. If we give the interactor complete freedom to improvise, we lose control of the plot. But if we ask the interactor to pick from a menu of things to say, we limit agency and remind them of the fourth wall. (Murray 1997, pp. 190-191)

In "The Challenge of the Interactive Movie" I suggested that the Problem of Internal Consistency was unsolvable, a quality of the medium that simply had to be tolerated rather than an obstacle to be overcome.

6.2 Internal Consistency in Tabletop Games

The Problem of Internal Consistency is not confined to computerized games; dungeon masters in tabletop role-playing games face it all the time. If a player violates the dungeon master's plans for the plot, the dungeon master usually redesigns the plot on the fly to accommodate the change. Improvisation is a key skill for dungeon masters. (Wyatt 2008, pp. 28–29) Because tabletop games are almost always multiplayer, it can be a considerable challenge to maintain plot coherence when different players have different goals. Addressing potential dungeon masters, Sean Patrick Fannon observed in *The Fantasy Roleplaying Gamer's Bible*,

> In a large group, sticking to the main story tends to be the only way to keep the group focused and keep things moving. This can be pretty unsatisfying for players who are more interested in exploring the personal issues of their characters... If you do end up with a large group... it is a good idea to make sure everyone understands the limitations [the size of the group] imposes on the game. You will need to encourage everyone to cooperate and accept that you can only do so much. (Fannon 1999, p. 62)

In extreme cases it is sometimes necessary to exclude players from the game entirely. (Decker 2005, p. 36)

In tabletop games, players define their own avatar characters, so violating character is generally not an issue in the literary sense of acting in a psychologically

inconsistent manner. However many such games establish explicit rules that prohibit certain activities for particular classes of characters, e.g. fighter characters cannot cast magic spells. In such cases the dungeon master simply forbids the action; these rules are fundamental to the game. A more ambiguous situation can occur when a player commits to role-play his character with a particular moral outlook, usually called an *alignment.* (Fannon 1999, p. 76) Arguments about whether a player is correctly playing their alignment do break out from time to time and must be adjudicated by the dungeon master. (Nelson-Brown 2006)

Finally, dungeon masters either exercise their special powers to forbid violations of the game world ("you can't have a musket; gunpowder hasn't been discovered") or simply ignore trivial violations such as spoken references to real-world events. In a multiplayer tabletop game a certain amount of out-of-character conversation is inevitable. This can become a self-fulfilling cycle if the players fail to engage with the story. (Nelson-Brown 2007a)

6.3 Attempted Resolution: Compromise

In "Why We Shouldn't Make Games" (Adams 2002b) I proposed a compromise that offered the player a certain degree of freedom while still providing a coherent story. I reprised this idea in "Interactivity Versus Narrative: This Time It's War!" (Adams 2003b) and again in "Interactive Narratives: Ten Years of Research". (Adams 2005a) I began by introducing two real-world characters (accompanied by photographs) at opposite ends of the scale of freedom:

> On the left we have soldiers in the trenches during World War I. They have a role to play in the war, but no freedom to decide what they will do or how. Their experience is not unlike playing a rail-shooter: all they can do is shoot, and advance if it is safe to do so. On the right we have a wealthy businessman in Peru during World War I. He has complete freedom to choose his actions: the war does not constrain him in any way. On the other hand, he has no power to influence the war, either. One group of people is totally constrained by their circumstances—the story they're in. The other person is completely unconstrained, but he's not in the story at all. (Adams 2005a)

I then suggested that there was a certain type of character in between these extremes, who would make a suitable protagonist in a video game:

> In between these two types of people is someone rather special. Someone like a commando, a resistance fighter, or a spy. Someone who is involved in an important situation, but has some freedom (but not total freedom) to choose his own actions.
>
> These kinds of people make good compromise heroes for storytelling games, because they have a certain amount of freedom, but not unlimited freedom, to influence the situation they're in. (Adams 2005a)

In retrospect, however, I realized that this compromise does not resolve the issue; it simply constrains the domain in which interactive storytelling can operate and puts an additional burden on the designer. Many games do indeed adopt this approach, but it is at best a workaround to the problem, not a solution.

6.4 Solutions Proposed by Others

In my search of the literature, Brenda Laurel's remarks on violating the virtual world are the only references to the Problem of Internal Consistency I have found that predate my "Challenge of the Interactive Movie". Although many people have noted the issue since, few have offered a specific solution. Most proposals—which seem to me to reflect their author's own history as a game developer and personal tastes—amount either to privileging the story at the expense of the player freedom or privileging player freedom at the expense of the story.

6.4.1 Privileging the Story

Laurel proposed to limit the player's actions by a combination of explicit and implicit constraints, and she argues for and discusses their implications in some detail. (Laurel 1990, pp. 99-112) She distinguishes between the two as follows:

> Explicit constraints... are undisguised and directly available. When we are in doubt about the 'legality' of certain choices or actions, we should be able to find the rules and protocols of a system straightforwardly expressed, either in the manual or in an on-line "help" facility. Implicit constraints, on the other hand, may be inferred from the behavior of the system. We can identify implicit constraints when a system fails to allow us to make certain kinds of choices. (Laurel 1990, p. 102)

Regarding implicit constraints, Laurel wrote,

> Constraints should be applied without shrinking interactive range as experienced by the user: they should limit, not what the user can do, but what

> he is likely to think of doing. Such implicit constraints, when successful, eliminate the need for explicit limitations on the user's behavior. (Laurel 1986, p. 107)

This particular suggestion is a pipe dream. Players always think of more things to try than the designer can possibly plan for and they often deliberately try to break any limitations imposed upon them.

Another early reference to the problem appears in Barbara Hanscome's article "The Play's the Thing", quoting game designer Jonathan Knight:

> To [Viacom game designer Jonathan Knight] the key to a successful interactive story game is aligning the player with the hero's objective. It's all about making sure the player and the hero want the same thing. "That's the way modern drama has always worked," explains Knight. "Stanislavsky felt that every story ever written hinges on the objective of the hero. Whatever the hero wants out of the story will drive that story to its conclusion." (Hanscome 1995, p. 51)

Knight suggested that this could be achieved by a sort of operant conditioning:

> "Because stories are so psychologically complex, and the distance between what the hero and the players want is so great, I think we need to use animal conditioning on our players, and basically reward and punish them psychologically, right in line with the objectives of the story for certain behaviors." He admits it sounds kind of diabolical, but it happens all the time in games. "If you think back to *Asteroids*, if you didn't destroy the rocks like you were supposed to, if you just sat there and cruised around and didn't go after the objective, then they started playing this music. It makes you really nervous and you get really scared. And if you go after the rocks, it stops. They're conditioning you."... The goal is to reach the player at a deeper level. "You don't want to reward and punish actions as much as want to reward and punish emotional responses. Emotion is what is deep down and subtle, and that's what the player is not going to be conscious of." (Hanscome 1995, p. 53)

Marie-Laure Ryan proposed that in a globally planned story, one can prevent players from violating the plot by reducing agency:

> For those who believe that narrativity is the product of global planning, not a type of meaning that can be freely constructed out of any collection of informational fragments, it is by controlling the general path of the reader, maintaining a steady forward progression, limiting decision points, or

> neutralizing the strategic consequences of decisions that interactive texts can guarantee narrative coherence. (Ryan 2003, pp. 256–257)

Note that her proposal doesn't address the issue of players violating the avatar's character or violating the game world.

Gian Mancuso went even farther, suggesting that if a game offers any gameplay activities (which he calls *mechanics*) that permit the player to violate the plot, the gameplay is badly designed. So, if a player can kill her avatar by flying into a cliff, thus ending the story prematurely, Mancuso suggests that the gameplay should have been designed in such a way that flying into cliffs was not lethal. Even if a player wants to commit in-game suicide by this means, she should simply not be allowed to. (Mancuso 2010) This approach—prohibiting any player actions that might violate the plot, including suicidal actions—is commonplace in the adventure game genre. Players of adventure games have few expectations that the games will simulate the laws of physics accurately, but Mancuso's approach is bound to produce absurdities in more realistic genres.

Interestingly, in *The Art of Computer Game Design* Chris Crawford did not discuss the need for a story to provide consistency of plot or character, but instead the need for a story to include surprises—plot twists—which he asserted could only be done in an interactive story by limiting player freedom:

> Stories enjoy a particular advantage over the current generation of computer games: the element of surprise. A good story boasts an array of interesting plot twists. The storyteller leads us into a set of expectations and then cleverly inserts a new factor that creates a disjunction, a new and dramatically different situation. This process can be repeated many times during the course of the story. Among computer games, only adventures provide this element of surprise. Unfortunately, the surprise can only be created by limiting the player's freedom of action so as to guarantee that the player will encounter the surprise under the proper circumstances. After a while, all adventures begin to smell like primrose paths. (Crawford 1984)

Crawford was not actually arguing *for* privileging the story; he merely observed that games in the adventure genre did so. In such games the player cannot usually kill her avatar or anyone else who might be critical to the plot.

Among interactive drama systems, Young *et al.*'s MIMESIS system attempts to replan the plot when the player tries to do something that potentially produces internal inconsistency in its current plan. If it cannot find a satisfactory alternative, however, MIMESIS intervenes by preventing the player from taking the action, in effect privileging the story. (Young 2003)

6.4.2 Privileging Player Freedom

Few commentators who privilege player freedom actually suggest that game designers should not care, or that players do not care, whether stories are well-formed or not; rather, the commentators usually suggest that if a story is likely to interfere with the player's freedom, the story should be de-emphasized as part of the player's experience. Game designers who have spent much of their careers thinking about video games as systems of rules or sequences of challenges rather than as storytelling media often take this position. One such is Chris Crawford, who asserts flatly, "Do not impose your preferences on players; permit them all reasonable options and then impose the consequences of their choices." (Crawford 2004, p. 211). Crawford does not specify exactly what *reasonable* means, but apparently the scope is a broad one:

> The solution is to shift our thinking from the things of stories to the processes of storytelling...This abstract approach gives us ready answers to several of the commonly cited objections to interactive storytelling. If you think of an interactive story as a collection of story-parts, then the objection that the user must play along with the story-parts is compelling. But if you think of interactive storytelling as a process of responding to the user's interests, then behavior that is viewed as perverse in the old model is now seen as informative. "You don't like Juliet? How about someone more like Cindy Crawford? Or Mother Theresa?"... The basic conflict emerges because the artist insists on taking the audience down a predetermined path (as is the case with conventional stories), while at the same time demanding the audience's active involvement in the course of the experience. The solution is for the author to relinquish control of the path to the audience. (Crawford 1996b)

Crawford's distinction between stories themselves and the process of storytelling is useful, and echoes something that I have observed also: both the Problem of Internal Consistency and the Problem of Narrative Flow are exacerbated by the use of narrative content. As this content is immutable, it cannot change in response to player actions. (Adams 2005a) But Crawford privileges player freedom to an extreme

degree; he proposes that an interactive storytelling system should be able to interchange Juliet, Cindy Crawford, and Mother Theresa as characters at the player's whim. The chances that an intelligent human being, much less a computer, would be able to generate a well-formed story under those circumstances are slim indeed. Crawford also argues that "users can never be in error" and the players should be able to do as they wish because "they're paying for the software". (Crawford 2004, p. 209) He makes an analogy between games that offer interactive storytelling and *Microsoft Word*, in that the user of a word processor is entitled to write anything he wants. (Crawford 2004, pp. 210) The disanalogies between the two are so glaring that there is scarcely any need to point them out; I confine myself to observing that *Word* is a creative tool whose designers seek to maximize its affordance, and an interactive story is not.

Greg Costikyan is suspicious of games as a storytelling medium, full stop. He wrote in "Where Stories End and Games Begin":

> To think of games as "a storytelling medium" leads to futile attempts to strait-jacket games, to make them more effective stories at the expense of gameplay. Instead, designers should use story elements to strengthen their games when appropriate but not be afraid to shy away from story entirely at times. Because ultimately, what a player takes away from a game is not the story it tells (if it tells one at all), but modes of thought and ways of attacking problems, and a sense of satisfaction at mastery. (Costikyan 2000, p. 52)

(To give him his due, Costikyan has softened his stance somewhat since then; see his "Games, Storytelling, and Breaking the String". (Costikyan 2007))

Jordan Mechner states it more baldly still: "In film, story is king... Not so in video games. The gameplay isn't there to serve the story; it's the other way around. The purpose of the story is to support and enhance the gameplay... The challenge for the writer is to invent a story that will fit this gameplay, making the most of its strengths without highlighting its limitations." (Mechner 2007, p. 112)

Andrew Stern's position on the subject is clear: "To give players high agency means they have enough influence to push events in all kinds of directions. As a result, the story may not have a singular overall coherency, but that's okay; that's what the player wanted to do!" (Stern 2006)

Heather Barber defines *interactive narrative* in such a way that she clearly privileges player freedom:

> An interactive narrative is a game world in which the user-controlled character(s) can physically and mentally interact with ideally (perceived) total freedom while experiencing a dramatically interesting narrative which is fundamentally different on nearly every play—dependent on the user's actions. (Barber 2008, p. 16)

She states further, "In an interactive narrative it is necessary for the user to believe that they have complete freedom of action." (Barber 2008, p. 21) However, she emphasizes that her approach only requires perceived freedom rather than actual freedom:

> There may be other implicit constraints on the user (particularly those involving moral values), but as long as these are consistent with the user's perception of the game world the user will still believe that they are free within that world. (Barber 2008, p. 38)

With respect to players acting out of character, Raph Koster has observed, "A roleplay-mandated world is essentially going to have to be a Fascist state. Whether or not this accords with your goals in making such a world is a decision you yourself will have to make." (Koster undated) Koster was referring to massively-multiplayer online games, but the question of whether players should be allowed to act out of character applies to single-player games also. His use of the loaded term *Fascist state* suggests that he opposes efforts to constrain the player.

My own remarks at the end of "The Challenge of the Interactive Movie" (Adams 1995), as described on page 46, condemned efforts to constrain player freedom. I did not want designers to give up on well-formed stories; rather I wanted them to avoid the problem by not attempting to create stories with predefined plots at all.

6.4.3 Sandbox Games

At the end of "The Challenge of the Interactive Movie" I urged designers to concentrate on creating virtual worlds from which story-like experiences might emerge ("worlds in which stories can happen"). (Adams 1995) One such approach to this is the sandbox game.

The idea of an interactive environment in which the player, through an avatar, can "go anywhere and do anything" has long been a dream of both players and game developers. (Adams 2006a) This does not mean that the environment lacks challenges, only that the player feels that she can explore the environment in any order she chooses and that she has a very large interactive range with which to manipulate objects and interact with (simulated) people. Games that exhibit these properties are known as *sandbox games.* I described these games, and some approaches to designing them, in "Sandbox Storytelling". (Adams 2010b)

The usual conception of a sandbox game is a large open world containing a collection of cause-and-effect mechanisms that might generate plot events, but nothing to force the player to experience these mechanisms in any particular order. These mechanisms may be local (if the player breaks a particular window a burglar alarm will go off) or global (if the player behaves immorally, he will get a bad reputation and simulated characters will refuse to deal with him). The player explores the world, interacts with people and objects, and may (possibly) experience a sequence of events along the way that are sufficiently interrelated and coherent to feel like a story. Designer Don Carson has dubbed this process *environmental storytelling.* (Carson 2000)

The *Grand Theft Auto* games famously include sandbox play, but they do not really use it as a means of telling stories or avoiding the Problem of Internal Consistency. The player cannot violate the plot no matter where he goes or what he does in the sandbox, because he cannot kill the characters or destroy the objects that are crucial to future events in the plot. It is a perfect example of interactive freedom without agency.

The *Grand Theft Auto* games place few constraints on the where the player can go, but his interactive range is restricted largely (but not entirely) to driving vehicles and committing acts of violence. This enables the player to create absurd situations, as Ben Fritz has pointed out: "It's impossible to care about Niko's [the player's avatar] relationship with Michelle [Niko's simulated girlfriend] early in the game when she doesn't care if he stabs people or dunks her in the water or gets in a dozen car

accidents while on a date." (Fritz 2008) Credibility is strained to the point that the experience begins to lose its story-like quality.

Bob Bates opposes sandbox games as a means of interactive storytelling: "[Open-ended environments] may be fun to explore, but they do not fulfil the obligations of a story. There is no beginning, middle, or end. There is no pathos, no human drama, no greater truth to be gleaned from the hard-fought battles that the characters wage." (Bates 1996) However, his criticism does not consider the role of time. If the plot advances with the passage of time rather than the player's exploration of space, it can certainly have a beginning, middle and end.

Mateas and Stern have also argued that sandbox games seldom produce well-formed story experiences for the player:

> The author can choose to place minimal constraints on the ordering of story pieces, allowing the local sequencing of pieces to depend on the local player interaction. But then the sequences produced will lack the coherency of well-formed story arcs. Fragmented plots, or plots heavily diluted with unorganized or non-useful bits of action, are common in hypertext fiction as well as some IF [interactive fiction]. (Mateas & Stern 2007)

Mateas and Stern ultimately produced *Façade*, which might be considered a verbal sandbox; it offers the player a very small physical environment in which to play, but he may say anything he likes by typing English text. It generates a plot line through conversational interactions, using a great deal of artificial intelligence. *Façade* also uses the passage of time, rather than exploration of space, as a means of advancing the plot. The player specifies the avatar, so there is no issue of the player violating character, and the user interface affords no actions that would violate the plot. However, *Façade* does not prevent the player from violating its virtual world, as I demonstrated in "A New Vision for Interactive Stories". (Adams 2006a)

In spite of these criticisms, the idea of the sandbox game as storytelling experience clearly has a long-lived appeal; game writer Justin Marks was still arguing for it in 2008:

> We need to stop thinking about story as a device to make us care about the gameplay (it doesn't), and start thinking about the gameplay as the narrative

> itself (thus, making us care). Now that the technology has finally reached a breaking point, a place where we can genuinely craft sophisticated worlds, we have to understand that plot is not forced upon those worlds artificially, but grown from our interactions within their environments. (Marks 2008)

In 2010 I wrote an article called "Sandbox Storytelling" (Adams 2010b) I proposed that such games require a mixture of player-dependent and player-independent events, so that if the player won't go to the plot (or can't find it, in an open world), the plot will come to her:

> The trick in sandbox storytelling is to build the plot with a combination of player-dependent and player-independent events. Keep things flowing no matter what the player does so the world doesn't seem static, but don't make it flow so fast that the player gets behind and loses the game (unless the plot is about finding a time bomb). Put a moderate degree of pressure on the player to act, but reduce the pressure if the player is on the right track. In a sandbox, exploration itself can't advance the plot—so instead, use a combination of the passage of time (that's the pressure) and player activity: meeting people, solving puzzles, making decisions, overcoming challenges. (Adams 2010b)

6.4.4 Procedurally Generated Plots

Procedural plot generation systems, which have so far mostly taken the form of academic research projects, offer potential solutions to the Problem of Internal Consistency. (Procedural plot generation is described in section 3.3.1.5.) Such a system attempts to create a well-formed story-like experience by algorithmically choosing plot events, or creating them, in real time as the player plays. The algorithm may use any of a wide variety of data to determine exactly what the player will experience: generic plot schemas, recorded player preferences or behaviour, the current state of the game world, and so on.

6.4.4.1 Violations of the Plot

If a procedural plot generation system contains no predefined plot elements at all, then, barring the presence of programming bugs, it should be impossible for the player to cause an absurdity in the plot because the future events of the game depend entirely on its current state rather than upon the dramatic goals or intentions of the designer. It is, in effect, a pure simulation system.

The disadvantage of such an approach is that it leaves very little room for the designer to collaborate in the creation of a story-like experience. Whatever dramatic forces are at work in such a system must be implemented entirely procedurally, and are likely to be unpredictable, as Marc LeBlanc observed in “Emergent Complexity, Emergent Narrative.” (LeBlanc 2000) In practice, most of the academic efforts to create interactive dramas have included some form of partial plot authoring system for the designer to use. In their survey of interactive drama systems, Roberts and Isbell asserted that a degree of authorial control was a desideratum for any such system. (Roberts 2008) Some automated story-generation systems such as RoleModel are in fact designed as authorial tools. (Chen 2010)

As described in section 6.4.1, MIMESIS prevents plot violations by replanning if possible, and by forcibly intervening to prevent them, if necessary. Magerko and Laird’s Interactive Drama Architecture (IDA) system intervenes in more subtle ways. Using a model of the player’s behaviour, IDA attempts to predict and prevent plot violations from occurring, and does so either by modifying the game world (creating a fresh copy of a plot-critical item if the first one is destroyed, for example), or directing an autonomous AI-driven NPC to find a way to resolve the problem. Unless it detects a potential (or actual) plot violation, IDA does not otherwise interfere, allowing the player to experience the plot in his own way. (Magerko 2004) Roberts and Isbell praised IDA for its *invisibility*, the degree to which its machinations go undetected by the player. (Roberts 2008)

In contrast to both of these approaches, Reidl and Stern’s Automated Story Director (ASD) system begins with a linear story that represents the designer’s ideal experience, then computes every possible way that the player might violate the plot and generates a contingency plan for each one that resolves the difficulty in a believable way. This process is computationally expensive, however, and was only tried in a limited domain. (Riedl 2006)

6.4.4.2 Violations of Character

Procedural plot generation does not necessarily prevent the player from violating his character. Most of the interactive drama systems described in section 3.3.1.5 use nonspecific avatars, however, and so do not confront this issue. Many of them,

notably Magerko and Laird's IDA system, Barber's GADIN system and Thue et *al.*'s PaSSAGE, keep internal models of the player in an effort to predict her behaviour or to determine what she might find dramatically interesting. (Magerko 2003; Barber 2008; Thue 2007) These systems could probably be adapted to detect when a player was behaving out of character with a fully-specified avatar, but I am unaware of any such efforts.

6.4.4.3 Violations of the Game World

Violations of the game world occur when the player introduces incoherent content into the world. None of the interactive drama systems surveyed for this thesis permit the player to create game-world objects that might conflict with the world (e.g. spacecraft in a realistic depiction of the real world *circa* 1900). Almost all interactive drama systems, with the notable exception of *Façade,* prevent the player from violating the game world simply by prohibiting unrestricted natural language input ("free speech") by the player. Arinbjarnar *et al*. argue, not entirely convincingly, that prohibiting free speech and offering the player menus of speech acts from which to choose actually improves the player's experience by giving him options that he might not otherwise have considered. (Arinbjarnar 2009, p. 16) This viewpoint directly contradicts Janet Murray's assertion that "if we ask the interactor to pick from a menu of things to say, we limit agency and remind them of the fourth wall." (Murray 1997, pp. 190-191) In any case, it is currently extremely difficult to process natural language successfully, and that alone is a good reason to preclude free speech in a project with limited time and resources. Restricting the player's dialogue options to predefined cases enables the designer to guarantee that the player cannot say something that violates the game world.

6.5 Critique

This section discusses two weaknesses in my original discussion of the Problem of Internal Consistency: a failure to consider avatar specificity, and an unwarranted assumption that all players want as much freedom as possible.

6.5.1 Avatar Specificity

In "The Challenge of the Interactive Movie" my remarks on the Problem of Internal Consistency did not address the question of avatar specificity; I simply pointed out

that it was possible for the player to violate the character's nature. In that lecture I used Superman as an example, a highly-specified character taken from another medium.

I corrected this omission ten years later, in "Interactive Narratives Revisited." I proposed a Solution 1a and a Solution 1b to the Problem of Internal Consistency, both of which I rejected:

> **The Problem of Internal Consistency, solution 1a:** Don't give the avatar enough depth such that the player *can* violate his nature. In other words, don't let the player play Superman. Only let the player control someone without a personality. **Objection:** This is hardly good storytelling! Bland, neutral protagonists are not a hallmark of great literature.
>
> **The Problem of Internal Consistency, solution 1b:** Create a story so bland that there are no emotions or activities that can *be* inconsistent. **Objection:** Ditto. It's not good storytelling. (Adams 2005a)

Solution 1a prevents the player from violating her avatar's character. However, in rejecting solution 1a on the grounds that bland protagonists are boring, I did not consider player-created avatars. When the player creates her own avatar, there is no question of her violating the avatar's nature, because it is hers to define.

It is difficult to provide a high-quality story with predefined (not procedurally-generated or generic) plot events if the predefined plot events must be agnostic about the protagonist's character. I wrote in "Death (and *Planescape: Torment*)" that, "It's far easier to create a plot for a character to unravel if the character is a person with a history of her own." (Adams 2000b) I noted in "A New Vision for Interactive Stories" that conventional role-playing games typically use character-agnostic plots, but observed:

> RPGs also include character-agnostic situations, because they don't know in advance who's in the player's party. But the situations are almost always about clobbering something, so it doesn't really matter who's in the party. They aren't social situations, they're clobbering situations. So regardless of who you take into the party, the bad guy ends up dead. (Adams 2006a)

King of Dragon Pass, described in section 3.3.1.6, uses a hybrid plot generation mechanism that is agnostic about the characters in the game, but it has no

protagonist. Most of the narrative content of each dramatic situation is predefined, and the narrated outcome varies depending on which character the player chooses to insert into the situation.

Solution 1a does not solve the problems of the player violating the plot or the world. Solution 1b does. But a story as bland as solution 1b proposes would hardly be a story at all. I remain of the opinion that 1b is a poor solution.

6.5.2 Player Freedom

In "Interactive Narratives Revisited" I also mentioned the solution used by *The Longest Journey* and *Max Payne*:

> **The Problem of Internal Consistency, solution 2:** Don't give the player any actions to perform that will allow her to violate the avatar's nature. In short, limit the interactivity. **Objection:** this is hardly good gameplay! Placing limits on the player so that she cannot interfere with our nice story is not what players come to games for. (Adams 2006a)

In rejecting solution 2 I assumed that all players *want* the freedom to violate the avatar's nature (and, for that matter, the plot and game world). This was an unexamined assumption that I no longer agree with.

6.6 Resolution

I have shown that the Problem of Internal Consistency does not affect interactive stories that offer limited interactive range and that use unspecified or player-specified avatars. It remains a serious issue for interactive stories that offer great freedom and agency, and for those with highly-specified avatars. I have found a resolution to the Problem of Internal Consistency that privileges neither the player's desires nor the designer's wishes, but my resolution depends upon the schema that I introduce in chapter 10. Accordingly, I defer explaining my resolution to chapter 11. The details may be found in section 11.1, Resolution to the Problem of Internal Consistency, which begins on page 120.

7 The Problem of Narrative Flow

In the conventional view of storytelling, every well-formed story includes a climax that resolves its dramatic tension. For the dramatic climax to be credible, however, the viewer must experience a number of necessary precursor events that establish the tension, increase it, and believably lead to the dramatic climax. If the viewer does not experience these events, the climax will seem non-credible or incoherent. Movies or television shows that have been edited for length occasionally have this problem: the climax occurs, but the characters refer to events of which the viewer has no knowledge because the events have been edited out. The result is an incoherent, unsatisfying experience.

7.1 Original Statement of the Problem

In an ad-libbed remark, I introduced the Problem of Narrative Flow in "The Challenge of the Interactive Movie" as follows:

> Every [presentational] story has a dramatic climax...In that story, everything that has got to be ready for [the climax] to happen, happens ahead of time. You have to put it all together and make sure that everything is ready there for it to take place. If you're the author, you know that that's going to happen... because everybody's riding your train.
>
> But in the case of interactive media, there's somebody who's out of your control, and that's the player. How do you make sure that when the dramatic climax is ready to take place in your interactive story, your player is there and ready for it? (Adams 1995)

There are two issues here. First, how does the creator of an interactive story make sure that the player has experienced all the necessary precursor events when the dramatic climax occurs, in order to ensure that the climax is coherent? Second, how can the designer prevent the player from obstructing the plot by failing to perform necessary precursor events that depend on his participation?

7.2 Traditional Solutions and their Weaknesses

In "The Challenge of the Interactive Movie" (Adams 1995), I described the three traditional solutions to the Problem of Narrative Flow, and then showed how each of them was unsatisfactory. My arguments were as follows:

Solution 1: Make the plot linear or reduce player freedom. When the plot is linear, the player is guaranteed to arrive at the dramatic climax at an appropriate moment, because she must pass through all the necessary precursor events to get there. The player has no agency, however. The designer can also reduce player freedom, either overtly or covertly. When done overtly, the designer simply does not offer enough interactive range to the player to avoid the precursor events, or the designer punishes any attempt the player makes to evade those events. When done covertly, the designer promises the player freedom but does not in fact deliver. What appear to be choices that might cause the player to obstruct the plot in reality have no effect upon it.

I claimed that this solution is unsatisfactory because players want freedom and agency, and asserted that the whole point of the interactive medium is to provide them.

Solution 2: Use real-time plot advancement, as described in section 3.3.2.3, and if the player is not in the correct part of the game world and prepared for the dramatic climax when it occurs, he simply loses the game. When a plot advances in real time, all the plot events in the story are time-dependent rather than player-dependent, so the player cannot obstruct them. However, if he does not play quickly enough to keep up with the plot, he might fail to participate in, or witness, those events that are necessary precursors for the dramatic climax. I proposed he should lose the game in this case also. Solution 2 forces the player to play fast enough to be sure that he experiences all the necessary precursor events, thereby ensuring that the climax will be coherent.

I dismissed this solution on the grounds that it will cause the player to lose the game repeatedly, and condemn him to experience the opening parts of the story over and over again. I asked, “How many of you, when you sit down to read a book, read page one; and then page one and page two; and then page one, page two, and page three?” (Adams 1995) I said that this was an undesirable way to experience a story.

Solution 3: Let the player’s actions drive plot advancement. Some player actions advance the plot and others do not, but only when the player performs an action that

constitutes a necessary precursor event will he move forward through his plot line. This guarantees that the dramatic climax can only occur once the player has experienced all the precursor events required. Solution 3 is by far the most common one in traditional adventure games, and is popular because it supports agency and manifold stories.

I claimed that this solution is unsatisfactory because it gives a mechanistic feel to the experience. When the player performs the right kinds of actions, the plot advances, but when she does not, or performs the wrong kinds of actions, the plot remains stalled. All the motive power for the plot comes from the player.

I also quoted novelist John Fowles's remarks in *The French Lieutenant's Women* on the craft of writing:

> We know a world is an organism, not a machine. We also know that a genuinely created world must be independent of its creator; a planned world (a world that fully reveals its planning) is a dead world. It is only when our characters and events begin to disobey us that they begin to live. (Fowles 1998, p. 96)

My point was that the planned, mechanistic quality of Solution 3 produces only a dead world, and is therefore unsatisfactory.

7.3 Solutions Proposed by Others

Comparatively few commentators have referred to the Problem of Narrative Flow by name, and even fewer have offered solutions. Two who have addressed the question are Mary DeMarle and Chris Bateman.

DeMarle does not refer to the problem by name, but she characterizes it using almost my exact words. (DeMarle 2007, p. 73) Her discussion of the issue concentrates on the merits of linear, branching, and foldback (which she calls *parallel path)* plots. Predefined plots such as these will always guarantee that the player reaches the dramatic climax eventually, provided that the plot lines have been defined correctly; predefined plots limit agency somewhat (Solution 1). DeMarle discusses various ways of creating an *illusion* of player agency, while denying him actual agency.

Bateman has written an entire chapter entitled “Keeping the Player On Track”, (Bateman 2007) which implicitly includes the Problem of Narrative Flow. Bateman is mostly concerned with making sure the player does not get lost in the game world’s landscape or confused about what he should be doing, thus frustrating himself and delaying progress through the game (and story). Bateman defines the *spine* of the game as “the sequence of journeys and tasks that the player is expected to complete to follow the game story from the beginning to the end... The spine of any game consists of events that are absolutely mandatory. If those events do not happen, the story will not progress.” (Bateman 2007, p. 87) It seems clear that his notion of the spine of the game is similar to what I have called *necessary precursor events,* and that he expects that the game will use Solution 3 to guarantee that the dramatic climax occurs only when the player is ready for it.

By offering enough of what Bateman calls *funnelling* (“any system for ensuring that the players stay on or can find their way back to the spine of the game”) (Bateman 2007, p. 95), the designer can ameliorate the mechanistic feeling that Solution 3 produces. Instead of allowing players to wander endlessly while the plot remains stalled, a game making use of funnelling encourages the player to return to the journeys and tasks that are required for the plot to advance. Funnelling can take the form of explicit instructions to the player; hints from mentor or non-player characters; or mechanisms that prevent the player from moving too far away from that part of the game world where the plot takes place.

Funnelling is undoubtedly a useful means of alleviating the weakness of Solution 3; my only concern is that it should not be implemented in too heavy-handed a fashion or it will destroy immersiveness. Explicit instructions to the player violate the fourth wall.

Barber and Kudenko proposed a somewhat different approach to the Problem of Narrative Flow. In “Dynamic Generation of Dilemma-based Interactive Narratives” (Barber 2007) they describe an AI-driven system called GADIN (Generator of Adaptive Dilemma-based Interactive Narratives) that presents the player with a theoretically endless series of dramatic dilemmas, soap opera fashion, which are instantiated from one of five generic templates. When these dilemmas occur they are,

in effect, dramatic climaxes, but because they are presented continually, there is no single dilemma that can be characterized as *the* dramatic climax. The system maintains a state-based game world in which dilemmas, either for the player or the NPCs, may occur.

Barber and Kudenko's approach evades the Problem of Narrative Flow by continually searching for a suitable dilemma to present on basis of the current state of the game world and characters. If the player should fail to execute an action that constitutes a necessary precursor event for a currently planned dilemma, the dilemma is discarded and the system searches for a new one. Because the plot is procedurally generated, the player cannot obstruct it. In her PhD thesis on GADIN, Barber writes, "The user may try to avoid dilemmas. In this experience, as in life, however much the user tries to avoid dilemmas there will always be another. The adaptive nature of this narrative generation method means that there will always be dilemmas which can and will be experienced by the user." (Barber 2008, p. 75)

Magerko and Laird's Interactive Drama Architecture system associates timing constraints with key plot events as a means of establishing a certain pace for its story. (Magerko 2004) If the player stalls the plot, IDA's story director detects that a timing constraint for an upcoming plot event is about to be violated and intervenes to urge the player onward to experience the plot event. These hints may take the form of changes in the environment or verbal comments on the part of autonomous agents present. Although this approach does not absolutely resolve the Problem of Narrative Flow (the player may steadfastly refuse to touch the game machine's controls), it provides a believable way of reducing its severity.

7.4 Critique

The first and most obvious difficulty with the Problem of Narrative Flow is a simple one of nomenclature. The name does not use the term *narrative* in the naïve sense that I have adopted for this thesis. It should have been called the Problem of Plot Flow or Plot Continuity. However, to avoid confusion I will continue to use the earlier name.

Both my original definition of the Problem of Narrative Flow, and my rejection of some of the traditional solutions to it, were based upon several unexamined assumptions. In addition, I rejected some some solutions without considering various ways in which they could be improved. The following sections discuss the unexamined assumptions and consider modified versions of the solutions.

7.4.1 The Assumption of a Dramatic Climax

The definition of the problem presupposes that an interactive story will include a dramatic climax that must occur at a certain, fixed point in the story. It assumes that the player follows a predefined plot (perhaps with branches, side quests, or subplots) which must eventually lead to a dramatic climax. This understanding was based on a limited familiarity with Freytag's Pyramid. However, Freytag's analysis was confined to Greek and Shakespearean drama, and so does not necessarily apply to modern drama or other forms of storytelling. The classic arc remains by far the dominant dramatic structure in both presentational storytelling and in video games, but it is not absolutely required. In 2001, Greef and Lalioti presented an authoring tool for interactive storytelling experiences that does not create a specific climax, thereby avoiding the Problem of Narrative Flow for the stories their tool produces. (Greef 2001) Their approach does not universally resolve the problem, however, as many designers will want to create interactive stories that do have a dramatic climax.

7.4.2 The Assumption of a *Fixed* Dramatic Climax

The original statement of the problem also does not take into account the possibility that a storytelling engine might procedurally generate a dramatic climax at an appropriate moment based on the player's actions, rather than incorporating a fixed dramatic climax that the player must make ready for. This, in fact, is what Barber and Kudenko did, as described in section 7.3. In effect, the Problem of Narrative Flow is a conundrum that faces anyone creating an interactive story with a predefined plot or trying to add interactivity to a classic narrative story, but it does not consider procedural or emergent approaches to interactive storytelling. I recognized this later when I wrote in "Interactive Narratives Revisited":

> Two of my Three Problems for Interactive Storytellers—Internal Consistency and Narrative Flow—are problems caused by embedded narrative. The *Casablanca* problem [that it would be extremely difficult to make the film

> *Casablanca* into an interactive story] is essentially a problem of embedded narrative: the whole story *as told* fits together so tightly that any fiddling with it would make it fall apart. But if [the plot] were emergent, it wouldn't have a fixed structure of any kind. (Adams 2005a)[2]

7.4.3 The Assumption of a Player Desire for Freedom and Agency

My rejection of Solution 1 presupposed that *all* players want interactive freedom and agency, which I now recognize is not true. While players do generally value freedom, as Sweetser and Johnson demonstrated (Sweetser 2004), they do not all insist upon agency. Some players are perfectly happy to experience stories in video games without any ability to obstruct the plot or to influence their plot lines. The evidence for this can be seen in the success of such linear stories as *Portal*, which possessed a distinctive and much-praised story, yet offered the player no agency over its plot (Grayson 2012). Other linear storytelling games made by Valve Software have met with equal success, e.g. *Half-Life* and *Half-Life 2* (Carless 2003). My point is not that agency may be safely ignored, only that my original presupposition that *all* players insist upon it was faulty, as the popularity of the stories in these games demonstrates.

7.4.4 Re-Examining Solution 2

My rejection of Solution 2, real-time gameplay that forces the player to keep up with the pace of events or lose the game, assumed that time pressure would cause the player to make bad decisions or do badly at challenges, and so to fail frequently. I did not consider, however, that it is possible to create an interactive story in which there is no way to lose, and in which the player is free to act or not to act at all times. In *Façade*, play takes place in real time, and the player's actions consist of participating in a conversation. He is free to say something—or not—at every point throughout the story. Consequently, the player does not face challenges in the conventional sense and is not under significant time pressure. If he steadfastly refuses to speak, the story ends early, but this is a credible consequence of a player choice rather than a loss in its ordinary sense as a failure to overcome challenges.

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2 My assertion that the two problems are *caused* by embedded narrative content, and by implication, would not occur without it, was overstating the case. Players can certainly violate internal consistency by acting out of character with their avatars even if there is no narrative content. It would have been more accurate to say the problems are *exacerbated* by embedded narrative.

The player also need not lose the game the first time that he fails to experience a necessary precursor event. There are other approaches to implementing real-time plot advancement that are not as strict as the one I described:

- Some games with time-dependent plot events use a cyclic pattern so that if the player misses one plot event, he can try again later. In *Thief: The Dark Project* (1998) the player needed to sneak past guards, and the guards had a cyclic patrol pattern. If the player could not sneak past them at one time, he could come back at another. One could also design an interactive story in which the player had repeated opportunities to experience the dramatic climax, although there would need to be some limits on the number of opportunities the player had or the story would lose credibility.

- The plot of a manifold story can include more than one dramatic climax. Instead of causing the player to lose if he misses a necessary precursor event for a particular dramatic climax, the plot can branch at that point, going one way if he witnesses or participates in the event, and another if he does not. For example, if the player must solve a problem in a fixed amount of time, and fails, the problem simply remains unsolved, the plot branches, and the player experiences a different dramatic climax that reflects that situation.

In summary, if the plot consists entirely of time-dependent, player-independent plot events, the player cannot obstruct the plot, and so Solution 2 does resolve that aspect of the Problem of Narrative Flow. The designer must decide what consequences will occur if the player misses a necessary precursor event, or misses the dramatic climax because he was not ready for it, but as I have shown, these consequences need not be catastrophic. However, most plots do not consist entirely of time-dependent, player-independent events, so Solution 2 is not a universal solution.

7.4.5 Re-Examining Solution 3

The mechanistic nature of games that use Solution 3 remains a problem. However, in the years since I introduced the Problem of Narrative Flow, the video game industry has found ways of concealing the mechanistic nature of player-driven plot advancement. Bateman's funnelling, described in section 7.3, is one such. The

growing power of game hardware has provided others. Games can create the cosmetic impression that game world time is moving on—the sun goes up and down, non-player characters leave their places of work and go home to bed, and so on. Games can also supply the player with subplots and other distractions that divert his attention from the main plot for a while, thus obscuring the fact that the main plot is not advancing of its own accord. This approach is commonplace in large conventional role-playing games such as the *Baldur's Gate* series.

7.4.6 The Assumption That Only One Solution Will Be Used

My original criticisms of the three solutions that I proposed for the Problem of Narrative Flow considered each of them individually, and exposed the weaknesses of each when any one of them is used exclusively. I did not address combinations of these approaches in "The Challenge of the Interactive Movie" (Adams 1995). When I considered the question again ten years later in "Interactive Narratives Revisited: Ten Years of Research" (Adams 2005), I observed that the industry for the most part still used a combination of Solution 3, tying plot advancement to player activity, and Solution 1, offering reduced-agency stories.

In tabletop role-playing games, if the players deliberately obstruct the plot—avoid the dungeon master's predefined plot events—the dungeon master can rewrite the plot in such a way that the players have no choice but to experience the dungeon master's newly-created events. (Wyatt 2008, p. 28) In short, the dungeon master replaces player-dependent plot events with player-independent ones, switching from Solution 3 to Solution 2. Designers of computerized experiences may do the same thing, if the software is capable of it. For example, a non-player character who was waiting for the player to do something for him (a player-dependent plot event) may give up and claim that he got someone else to do it instead. Combined approaches to solving the Problem of Narrative Flow are certain to be more successful than one single approach.

7.5 Resolution

As my critique shows, the Problem of Narrative Flow is not as severe as I originally characterized it to be, and some of the solutions I originally proposed for it are not as undesirable as I suggested at the time. However, it remains the case that if the

designer offers a high-freedom experience whose plot absolutely depends on player participation at any point, the player may obstruct the plot at that point, thereby harming the story-like nature of the experience. Likewise, if the player has enough freedom to avoid experiencing necessary precursor events for a dramatic climax, that climax will be incoherent to the player if it occurs. I have resolved this problem through the schema introduced in chapter 10, so I defer further discussion until I have explained the schema. The details of my resolution may be found in the section 11.2, Resolution to the Problem of Narrative Flow, which begins on page 122.

8 The Tension Between Player Freedom and Well-Formed Stories

The tension between player freedom and well-formed stories underlies both the Problem of Internal Consistency and the Problem of Narrative Flow. Both problems occur only when the player has a degree of freedom that permits him to disrupt the story. I first identified this tension in "The Challenge of the Interactive Movie", although only in general terms:

> I think, in truth, interactivity and storytelling are in an inverse relationship to one another. I don't actually want to say that they're mutually exclusive, but I do think that the more you have of one, the less you're going to have of the other, and *vice versa*. (Adams 1995b)[3]

I expanded on this somewhat in "Three Problems for Interactive Storytellers":

> Interactivity is about freedom, power, self-expression. It's about entering a world and changing that world by your presence. In most games the world is static and dead until the player arrives; the player is the *only* thing that makes it move. 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 1999)

In "Interactivity versus Narrative: This Time It's War!", I identified the issue as a tension between the author's control over the story and the player's freedom:

> Narrative is about the author's control. The author must have *author*ity. The author takes you by the hand and leads you through the story. Interactivity is about the player's freedom... Interactivity and narrative are not in *conflict*, they are in an inverse relationship... You have to find the right balance between them. (Adams 2003b)

Andrew Stern has agreed:

> I think it's true that the purist concept... —complete freedom at all times for the player, and the real-time creation of a well-formed story—is, simply by definition of the terms involved, impossible, as much as I wish it weren't. For example, if towards the end of an interactive drama, you suddenly start acting very differently than you did up till that point, that would likely ruin the well-formed-ness of the story as it had been unfolding so far. (Stern 2003b)

3 Once again, when these lectures were written I was using terms differently from the way I do in this thesis. By *interactivity* I really meant *agency,* as discussed in Interactivity and Agency on page 29, and by both *storytelling* and *narrative* I meant "delivering a well-formed story."

Stern's example actually refers to one version of the Problem of Internal Consistency, violation of the character. The more freedom the player has, the more opportunities he has to violate the plot, violate his avatar's character, violate the game world, obstruct the plot, or render the dramatic climax incoherent. Even if the player's freedom does not extend to agency, so that he cannot violate the plot, he might still be able to violate his character or the game world, or obstruct the advancement of the plot.

This tension would not exist if players were always content to accept limits upon their freedom that constrain them to behave in ways consistent with the story. However, as I show in chapter 9, Faulty Underlying Assumptions, the video game industry has long sought to maximize player freedom, and has led some players to expect a great deal of freedom and few constraints. But even if all players were happy to accept constraints, some constraints are difficult to impose. For example, in a game that permits the player to speak sentences in ordinary English, it is practically impossible to prevent the player from introducing subject matter inconsistent with the game's world. The alternatives—both draconian ones—are to allow the player only to say predefined lines of dialogue, or to prohibit him from speaking at all.

In "The Gameplay Gestalt, Narrative, and Interactive Storytelling" Craig Lindley characterized the tension not as one between the well-formedness of the story and the player's freedom, but as an incompatibility between two patterns of interaction, which he calls *gestalts:*

> In the context of a computer game, one must learn and then perform a gameplay gestalt in order to progress through the events of the game. To experience the game as a narrative also requires the creation of a narrative gestalt unifying the game experiences into a coherent narrative structure. The tension between gameplay and narrative can now be viewed as a competition between these respective gestalts for perceptual, cognitive, and motor effort. Within the range of effort required for immersion and engagement, if gameplay consumes most of the available cognitive resources, there will be little scope left for perceiving complex narrative patterns, and little point in terms of adding to immersion and engagement. Conversely, focusing on the development of the sense of narrative (e.g. in the case of multipath movies) reduces the player's need and capacity for a highly engaging gameplay gestalt. (Lindley 2002)

His characterization is most useful for its observations on the conflicting demands of story and gameplay upon the player's effort and attention. However, his proposed solution called for creating a new genre of game centred on interactions among groups of human players. His paper did not address the single-player or single-character experience.

Much of the work on interactive drama has focused on devising procedural mechanisms that generate, or revise, well-formed stories in the presence of player freedom. In their survey of drama managers, Roberts and Isbell identify both authorial control *and* player autonomy as desiderata for a successful drama manager, while recognizing that this is problematic: "It is important to note that some of these desiderata are in conflict. For example, player autonomy and authorial control are well known to be in tension with one another. When implementing a particular approach to drama management, a trade off is unavoidable." (Roberts 2007) Drama managers usually seek to preserve well-formedness by adapting the plot in real time to the player's activities, as described in section 3.3.1.5, or, when necessary, preventing the player from disrupting the plot as described in section 6.4.4. Many of the approaches Roberts and Isbell surveyed attempt to resolve the problem by reducing designer participation to defining a set of abstract goals to be aimed for rather than providing explicit and detailed experiences for the player to have. This conforms well to Arinbjarnar *et al.*'s requirement that an interactive drama be different on every play-through. (Arinbjarnar 2009) However, as Roberts and Isbell observe, this can place a substantial burden on the designer, depending on the implementation. Some approaches, e.g. planning-based architectures such as IDA and MIMESIS, require a knowledge of AI techniques. (Roberts 2007) As I pointed out in "A New Vision for Interactive Stories", "conventionally trained writers are not used to doing their work in Microsoft Excel. They're even less used to doing it in code." (Adams 2006a)

So many people have mentioned the tension between player freedom and well-formed stories that it would be impossible to list them all. The majority of their discussion has focused on the Problem of Internal Consistency, and the most cogent

arguments have already been addressed in section 6.4, Solutions Proposed by Others, beginning on page 56.

9 Faulty Underlying Assumptions

The preceding four chapters have introduced and discussed the problems that I and many other commentators felt obstructed efforts to create well-formed computerized interactive storytelling experiences. Chapters 5–8 reflect the progress of my own thinking in the years 1995–2005.

In November of 2005 I attended the International Conference on Virtual Storytelling 2005 in Strasbourg, France. In the course of that conference, inspired by lectures from my colleagues and in particular one from Ken Perlin (Perlin 2005), I realized that many designers' and players' expectations and assumptions about interactive storytelling were the source of, or at least exacerbated, the Problem of Internal Consistency and the Problem of Narrative Flow. Perlin's lecture directly challenged assumptions about the nature of an ideal interactive storytelling experience, and this caused me to re-think several other issues as well.

In March 2006 I delivered the lecture "A New Vision for Interactive Stories" (Adams 2006a), which set out the new direction of my thinking. In that lecture I described three underlying assumptions that I and, I believe, many of my colleagues had long shared about the intended purpose and desired nature of interactive storytelling. This chapter introduces the three assumptions, along with a fourth that is a corollary of the first three. At the end I show how these assumptions have confused and constrained our understanding.

9.1 Assumption 1: Player Freedom and Agency Should be Maximized

Video game developers and players, like many others who work or play with high technology, are prone to a sort of utopian faith in technology—a certainty that all problems will ultimately be solved by technological advances. In "Transmitting Meaning In Interactive Contexts" I wrote, "We have a tremendous energetic enthusiasm for the benefits of electronics that nicely mirrors the Victorian enthusiasm for the benefits of steam... It is so deeply engrained in the culture of game development as to be axiomatic. If you even question it, you're some kind of a weirdo." (Adams 2003a)

This optimistic faith informs developers' expectations about what they can, and should try to, accomplish. Game developers have long felt that one of their long-term goals for interactive storytelling should be to maximize interactive freedom and agency, and the system should produce a well-formed story regardless. In "A New Vision for Interactive Stories" I explained that many older developers adopted this belief in response to their experience of playing the early text adventures:

> [Text adventures] didn't list the commands that were available. The text adventures pretended that the player could do anything. Of course the player realized, five minutes in, that that was false; he couldn't really do anything, because the machine didn't understand very much. But the immediate reaction of anybody who played the original *Adventure* was, "OK, well, you *should* be able to do anything," and, for those of us with an optimistic attitude, "Someday, we *will* be able to do anything." (Adams 2006a)

Andrew Stern also recognizes the desire for as much freedom and agency as he can get:

> I feel there's a kind of a tyranny in discrete, delineated choices, whether it be links in a paragraph of hypertext, a given set of commands in an IF [interactive fiction] adventure game, or a menu of dialog in a computer game. Explicit multiple choice makes me feel straitjacketed.
>
> What do I want?
>
> I want to be able to express myself **in my own way and on my own terms**, and have a meaningful, rewarding *impact*, some serious *effects*, on the fiction. (Stern 2003a, bold face mine)

I don't want to suggest that Stern genuinely wants unlimited power in a game; after all, his remark appears in the context of a discussion about the relative merits of discrete choices versus more free-form interaction. But "in my own way and on my own terms" certainly asks for a lot from a piece of software.

The same assumption informs efforts to create sandbox games, described in section 6.4.3. The *Star Trek* holodeck to which Janet Murray refers (Murray 1997) is a fantasy vision of this goal attained (along with a number of other useful features): the ultimate sandbox game. Clearly *Star Trek: The Next Generation*'s writers recognized the appeal of great freedom and agency in an interactive storytelling experience.

9.2 Assumption 2: Interactive Stories Shouldn't Be Games

This assumption refers to games in the formal sense of the term: games with a victory condition, which challenge the player to accomplish specific goals.

In "Will Computer Games Ever be a Legitimate Art Form?" (Adams 2001) I observed that games that provide challenges and a victory condition (true games in the formal sense), might not ever be accepted as works of art: "I'm not entirely sure that [a victory condition] is compatible with art, although I haven't made up my mind on the subject yet. As soon as you establish a victory condition, give the player a goal, the player starts to work towards something. They concentrate their attention on achieving the goal. I'm not convinced that you can be having an art-appreciation experience if you're working towards a goal at the same time."

The term *immersion* has no agreed-upon formal definition, but is used informally to refer to a player or viewer's detachment from their true physical surroundings and their concentrated attention upon a game, story, task, or virtual space. Various scholars have studied immersion in games. In an early example, Brown and Cairns interviewed players orally about their feelings of immersion after they had played their favourite games for 30 minutes (Brown 2004). More recently, Nacke, Stellmach and Lindley studied the players of first-person shooter games and sought to correlate their subjective reports about immersion obtained from questionnaires with objective data collected via electroencephalograph as the players played (Nacke 2011). The goal of most such studies has been empirically to establish degrees of immersion and the psychophysiological states that accompany them.

In "Postmodernism and the Three Types of Immersion", (Adams 2004a) I proposed that immersion was not a single phenomenon, but actually three different phenomena produced under different circumstances. I referred to these as *tactical immersion*, the immersion of high-speed action, also known as "the zone" or "the *Tetris* trance"; *strategic immersion*, the immersion of the chess master; and *narrative immersion*, or the immersion of the story audience. Björk and Holopainen reached a similar conclusion in *Patterns in Game Design.* (Björk 2004) They divided immersion into four types: *spatial immersion,* which is produced by manoeuvring in a game world in real time; *emotional immersion,* which is produced by empathy with characters and is

similar to my *narrative immersion; cognitive immersion,* which occurs when players focus on abstract reason and problem-solving, and is similar to my *strategic immersion;* and *sensory-motoric immersion,* which is produced by physical movements and sensations in repetitive gameplay, and is similar to my *tactical immersion.* Later I was to learn that Marie-Laure Ryan had already subdivided narrative immersion (in the context of conventional stories such as books or movies, but not interactive experiences) into spatial, temporal, and emotional forms. (Ryan 2003, Chapters 4–5)

In the article, I speculated that strategic or tactical immersion might not be emotionally compatible with narrative immersion. Different players like different kinds of immersion, and those who enjoy narrative immersion might be distressed when a gameplay feature takes them out of it. In "From Narrative Games to Playable Stories" (Ryan 2009), Ryan arrived at a similar conclusion, arguing that her temporal and emotional forms of narrative immersion are poorly compatible with interactivity because producing these immersive states requires a high level of authorial control over the events of the story.

In "A Theory of Fun for Game Design" (Koster 2005), Raph Koster had a similar viewpoint but drew a different conclusion. Koster asserts that most of the fun of playing games lies in learning and achieving mastery over the game, and so stories are a distraction from the gameplay experience. He states:

> By and large, people don't play games because of the stories... Since the games are generally about power, control, and those other primitive things, the stories tend to be so as well. This means they tend to be power fantasies. That's generally considered to be a pretty juvenile sort of story. (Koster 2005, p. 86)

> Story, setting, and backplot in games are nothing more than an attempt to give a side dish to the brain while it completes its challenges—sometimes, the hope is that it makes up for an otherwise unremarkable game. (Koster 2005, p. 87)

Koster's characterization of games as "generally about power, control, and those other primitive things" describes the same kinds of games I was talking about in Adams 2001—formal games that offer strategic or tactical challenges. It seems clear

that he feels those kinds of games don't lend themselves to good stories, although Koster's concern is more about the subject matter than the nature of the player's experience.

As I felt about art, so I felt about the ideal storytelling video game: whatever it turned out to be, it shouldn't, or wouldn't, be a game in the formal sense of the term. Here is how I described *Façade*, an interactive drama, in July of 2005:

> *Façade* doesn't give you a goal, which is why it's not a game. You can try to save [the non-player characters'] marriage, or you can try to split them up, or anything else you feel like. There's no way to win or lose, no value judgments about the quality of your play. By avoiding the "game" paradigm *Façade* also avoids a lot of baggage that games bring with them: connotations of strategy and competition, and the sense that it doesn't really matter... You play not for the sake of a final score, but for the sake of something more important: Trip and Grace's happiness. By the end of the evening, something that you say or do may have changed their lives radically. (Adams 2005b)

Assumption 2 also included the idea that a storytelling video game would hide from the player any internal mechanisms that it used to generate the story, and that it might not have an internal economy[4] at all. I was to explain this later:

> I've tended to think of interactive stories in terms of adventure games (which lack an internal economy), because they're the ones with the deepest characters and the richest plots. They're the ones that seem the most story-like and the least game-like. They don't have a lot of numbers. They don't give the player an artificial goal to shoot for, and they're not about winning and losing, and so on. (Adams 2006a)

9.3 Assumption 3: The Player Shouldn't Have to Think About Any Rules

The rules of games tend to fall into four categories:

- **Rules for the core mechanics.** These define the key resources of the game; how they come into or go out of the game, and how they flow inside the game. "Each time a player's token lands on or passes over GO, whether by throwing the dice or drawing a card, the Banker pays him/her a $200 salary" is one of the mechanics rules of *Monopoly.* (Parker Brothers undated)

4 The term *internal economy* in my pedagogy refers to "a system in which resources and entities are produced, consumed, and exchanged in quantifiable amounts." It refers specifically to numerical, rather than symbolic, game mechanics. (Adams 2009, p. 300)

- **Rules defining goals and the victory condition,** also sometimes referred to as the object of the game. The rules of *Monopoly* state that, "The object of the game is to become the wealthiest player through buying, renting and selling property" The victory condition is defined as "A bankrupt player must immediately retire from the game. The last player left in the game wins." (Parker Brothers undated)

- **Rules setting out the order of play.** These rules give the sequence of events in the game, and at what points the players may act if it is a multiplayer game. In simple multiplayer games the players usually take turns, but complex games may consist of rounds made up of many different stages. The board game *Civilization* (1980) exemplifies the latter.

- **Rules that define permitted, required, and prohibited actions** that the players may, must, or must not take. "Money can be loaned to a player only by the Bank and then only by mortgaging property. No player may borrow from or lend money to another player" is one such example from the rules of *Monopoly.* (Parker Brothers undated)

Video games have exactly the same kinds of rules, but they are implemented in software. In "A New Vision for Interactive Stories" I observed,

> In an ordinary board game you have to obey rules, and to obey them you have to know what they are. This is a conscious process. There is a list of permitted and prohibited actions, and you are aware of the rules at all times. But video games hide the rules. This is great, because it contributes enormously to player immersion. The game knows the rules, so you don't have to. The permitted actions are implemented by the user interface, and the prohibited actions are simply not available. So we have trained our players to believe that if a thing is possible, it must be permissible. If they're not supposed to do a thing, it shouldn't be available. (Adams 2006a)

Given that game developers have long sought to hide the rules of video games in order to improve player immersion, it is a natural assumption that a storytelling game should do so also—in fact, would hide them even more completely. Players would not have to think about any artificial constraints on their behaviour; the game imposes such constraints as there are (which should be few, under Assumption 1).

9.4 Assumption 4: The Designer is Entirely Responsible for the Player's Experience

A corollary assumption that many designers make, implicit in all the foregoing, is that the designer is entirely responsible for the quality of the player's experience, including the experience's consistency and credibility as a story. The player has no obligations at all. Players, too, usually believe this, in large part because the game industry has taught them to believe it, as explained in the preceding section. I did not mention this assumption explicitly in "A New Vision for Interactive Stories", but I did say, "We've been treating the player like a reader of a book. Like a person we know nothing about, who doesn't owe us anything. He should be able to do what he likes. And that's wrong. Because he's collaborating with us to create the interactive experience." (Adams 2006a) Literary theorists have long considered readers to be collaborators in the creation of their own experience also, but while reading and understanding are active processes, they are not *inter*active ones; they cannot change the text on the page or render the text itself incoherent. I address the player/designer collaboration in greater detail in section 10.1.

9.5 Challenging the Assumptions

Having introduced these assumptions in "A New Vision for Interactive Stories" (Adams 2006a)I then went on to argue that, far from representing laudable goals that game developers should seek to achieve, they actually held back the advance of interactive storytelling.

9.5.1 Maximized Freedom and Agency

The experience of maximized freedom and agency—the ultimate sandbox—sounds like fun, but it is inconsistent with what a story *is*. Every story, presentational or interactive, includes a setting, and with the setting come certain expectations about the world and its limitations. The protagonist's freedom cannot be unlimited or the story will not sustain dramatic tension. Even Superman has his limits.

Given that there must be *some* limitations on what a protagonist in a game or in an interactive story can do, it falls to the designer to decide what those limitations will be. The designer should offer the player actions to perform consistent with the designer's own plans for the story's world, plot and protagonist, and with his

understanding of what his representative player[5] will want to do. In an interactive story the player's interactive range can be large, but it must be bounded by the inner laws of the story's world. If a designer were to create a Jane Austin game about social relations among the British middle class of the early 19th century, and he offered the player shooter-style play with 20th century weapons in a misguided effort to maximize player freedom, it would be the designer, not the player, who was at fault for creating incoherence in the social fabric. A designer might choose to offer the player actions inconsistent with the story's premise for comedic effect—Elizabeth Bennett with a machine gun—but in that case the incoherence would be intentional, and certainly not a fault that either the designer or the player was entitled to complain about. Comedy does not try to produce narrative immersion, as I explained in "Postmodernism and the Three Types of Immersion". (Adams 2004a)

Players who seek to become immersed in a serious (non-comedic, non-satirical) story may want freedom and agency, but the immersion they seek necessarily requires that their options for interaction to be compatible with the story's setting and premise. Powers or abilities that are inconsistent with the story would destroy the player's immersion. It is for the designer to decide exactly what the player's interactive range will be, based upon the designer's own definition of the premise of the experience he wants to offer. He may, if he chooses, offer the player options that allow the player to behave incoherently with respect to the game world; he may also choose not to.

Michael Mateas agrees with this view:

> Why do I have to give the player verbs that are completely unrelated to the dramatic context? The player will experience agency if they have verbs that are appropriate given the story potential (the formal affordances) of the experience. So the interactive drama designer doesn't have to deal with the player being able to do everything (in "traditional" games the player has a limited set of verbs available as well). (Mateas 2004b)

Having seen that designers may have good reasons to restrict interactive freedom, is the same true of agency? I believe so. To assert that designers should maximize

5 My preferred method of teaching game design, player-centric design, requires that the designer imagine a representative player and think in terms of what he or she wants from the game. *Fundamentals of Game Design, Second Edition* defines player-centric game design in detail. (Adams 2009 pp. 30–33)

agency at all times is to assert that all plots must be infinitely malleable. Giving the player the power to modify the plot to any degree at any time turns the player into a storyteller, not a role-player. It would certainly destroy dramatic tension and render the experience less story-like. Rather than suffering the burden of an obligation to maximize agency at all times, designers should offer as much agency as they feel the experience that they are creating requires, and that the representative player will want. Not all players insist on maximum agency in any case, as can be seen from the success of storytelling games that offer the player quite limited agency, such as *Half-Life*.

In summary, while some players undoubtedly want as much freedom and agency as they can get, taking this to extremes creates problems in storytelling contexts. It is erroneous to assume that designers should always seek to maximize freedom and agency. The "ultimate sandbox" is not only technically unrealistic, but a poor setting for a storytelling experience.

The degree of freedom and agency that an interactive storytelling experience offers should be a function of the designer's original premise for the experience, rather than based upon an unreasonable assumption that the designer should always maximize them. The designer is under no obligation to alter the amount of freedom and agency that she plans to offer if to do so would subvert her goals for the experience as a whole.

Ultimately, I came to the conclusion that a game has a premise that players must accept if they want to play the game, and an interactive story also has a premise that players must accept if they wanted to experience a well-formed story. This does not mean that the designer must deny the player agency, or that the story must end in a particular way. But in order to have a satisfactory story experience, the player must accept the setting and internal laws of the story's world. I observed in "A New Vision for Interactive Stories,"

> What if I play a war game as a pacifist, or a business game as a communist? I will lose. When you play a game you must accept the premise of the game, and there is no reason why an interactive story has to be workable for a player who refuses to accept its premise. (Adams 2006a)

9.5.2 Interactive Stories Shouldn't be Games

Assumption 2, described above, states that an ideal storytelling video game will not be a game in the formal sense, and that such a game will hide from the player any numerical mechanics that it uses to create a well-formed story.

As I explained at the beginning of this chapter, hearing Ken Perlin's paper (Perlin 2005) at the International Conference on Virtual Storytelling caused me to recognize that assumption 2 had been limiting my thinking on interactive storytelling (and that of a good many other commentators as well).

Perlin describes a player who does not play a role *as* a character in the game, but who has the power to manipulate the game world around the artificial characters. (Marie-Laure Ryan calls this "external-ontological interactivity". (Ryan 2001) It is the way *The Sims* (2000) is played.) Perlin suggests that the "believability" or "interestingness" of artificial characters in a game world depends in part upon constraining the player not to manipulate the world in improbable ways—an idea clearly related to the Problem of Internal Consistency.

In the course of his lecture Perlin made the remark (which does not appear *verbatim* in his published paper): "The cost of an event in an interactive story should be directly proportional to its improbability." I was later to dub this "Ken Perlin's Law". (Adams 2006b)

Perlin went on to say,

> To enforce believability, we can maintain some sort of cost for making choices. For example, the player can be given a certain store of spendable energy. Making a choice costs a certain amount of this energy. (Perlin 2005)

Perlin's suggestion directly challenged assumption 2. Instead of avoiding or hiding an internal economy, he proposed that a storytelling game should establish one and use it as a means of modulating the player's freedom so as to maintain credibility. Although Perlin described a game with an an omnipresent interaction model and I am here concerned with avatar-based models, I recognized that his idea could make it easier to build interactive storytelling engines that procedurally generate credible and

consistent story-like experiences. Inspired by Perlin's lecture, I later proposed the idea of a "credibility budget", (Adams 2006a) which I discuss in section 12.3.

Assumption 2 also asserts that an interactive story should not be a game in the sense that it should not be about a struggle to achieve victory. That prohibition is too absolute, however. Many stories concern struggles of one kind and another, and some of stories have game-like qualities. The mystery genre serves as an excellent example: The author gives the reader all the clues to the mystery, interwoven with red herrings, action, and other content. The reader tries to solve the crime in her mind, and checks her conclusions against the detective's conclusions at the end of the story. If the reader is right, she feels a satisfaction similar to the sense of victory that the winner of a game feels. Marie-Laure Ryan supports this view; in "From Narrative Games to Playable Stories: Toward a Poetics of Interactive Narrative" (Ryan 2009) she argues that the desire to know (which she calls *epistemic immersion*) is relatively easy to achieve in an interactive environment.

We would certainly not wish to preclude mysteries in interactive storytelling, nor any other kind of story that involved struggle and victory. Assumption 2 might be more usefully restated to assert that a well-designed interactive story should not allow any game-like elements it contains to harm its story-like quality.

9.5.3 The Player Shouldn't Have to Think About Any Rules

Assumption 3 asserted that in interactive storytelling, the player shouldn't have to think about rules, or to voluntarily constrain his behaviour. If an act is possible, it is permitted. But as I observed in "A New Vision for Interactive Stories":

> That's not tenable in social contexts. It's OK for actions involving physical activity, and we can place limits on the user interface to restrict player actions in a physical context. It's problematic when the action is speech [i.e. actual spoken words], because we can't impose limits on what players can say. We've become very well aware of this in MMOGs [massively-multiplayer online games], because a lot of players come into MMOGs bringing with them the same kind of expectations that they have about single-player games, namely, "If I can do it, I'm allowed to do it." And in fact, MMOGs have had to impose explicit rules that players obey voluntarily, restricting their speech. MMOGs violate the "If you can do it, it must be allowed" assumption. (Adams 2006a)

Assumption 3 arose because the earliest video games were single-player games and their mechanics were primarily concerned with economics or physics. Under those circumstances it is easy and natural for the computer to handle all the rules. But in a game about social interaction, and even more in a game about dramatic interaction, the player must exercise some self-control. In the lecture I went on:

> What limitations may we place, then? Well, I think there are three: The physical, the social, and the dramatic laws of our story world.
>
> **The physical laws:** The player must act in conformance to the laws of physics of his world. We may absolutely prohibit (or rather, decline to implement) actions that violate them.
>
> **The social laws:** The player must act in conformance to the social laws of his world. If she violates those norms, the game is entitled to misunderstand her, to ostracise her, to lock her up as mentally ill, or to execute her—just as the real social world does.
>
> **The dramatic laws:** The player must act in conformance with the role that he as agreed to play. He must accept the premise of the game, or our obligation to provide him with a coherent story is at an end. (Adams 2006a)

Note that I did not propose that a player who violated the dramatic laws should be punished or constrained, only that the designer's obligations are contingent upon the player's behaviour. I address this further in section 10.3, The Designer/Player Contract.

A designer can indeed create an interactive experience that is essentially a playground in which players can say and do what they like without any consequences. *Second Life* (2003) is a good example. It violates our real-world notions of the laws of physics, but the players accept that for the sake of the freedom that it offers. But if players want an experience with realistic physics, they will look for games that implement and enforce the laws of physics. The same argument may be made about the social laws and the laws of drama. A game can easily allow a player to behave any way he wants in a dramatic situation, but certain behaviours violate the laws of drama—creating incoherence or obstructing the plot, as I have shown. If players want an experience with realistic drama, they will prefer games that impose dramatic laws, and and they will act in ways that conform to them.

I develop this idea further in the next chapter.

9.6 Summary

This chapter has examined the three faulty assumptions about what an ideal interactive storytelling experience should be like that I discussed in “A New Vision for Interactive Stories,” (Adams 2006a) plus a fourth. The foregoing assumptions have been around for nearly 40 years, and are deeply embedded into the consciousness of the video game industry. They collectively represent a wonderful utopian ideal: a story world where a player can do anything he likes at any time, with a high degree of agency, and a credible, coherent, interactive story will somehow magically take place around him.

It is an appealing idea, and in a sense that ideal is already realized—in the imaginations of young children. Children are both extremely credulous and extremely tolerant of incoherence. When children play storytelling games they often produce plots that sound ludicrous to adults, because adults have higher standards. The game industry’s efforts to reconcile the requirements of adult storytelling with the demands of this utopian dream have always met with failure and often wasted millions of dollars into the bargain. In “A New Vision for Interactive Stories” (Adams 2006a) I proposed that practitioners should abandon these assumptions and adopt a new way of thinking about interactive storytelling.

10 The New Vision: A Designer/Player Role-Playing Contract

As we have seen, the game industry has long made certain faulty assumptions about what an ideal interactive storytelling experience should be like. Combined with the tension between player freedom and well-formed stories, these assumptions cause problems, two of which are the Problem of Internal Consistency and the Problem of Narrative Flow. I have shown that on closer examination these problems are neither as universal, nor as intractable, as I suggested in "The Challenge of the Interactive Movie." (Adams 1995) However, they do remain troublesome in a particular case: interactive stories that offer the player a great deal of freedom, especially those stories with predefined plots.

In section 3.1.1 I explained that the participant in an interactive story performs as audience, as actor, and as player in both of Callois's senses. Most of the efforts to resolve the tension between player freedom and well-formed stories, and its related problems, have concentrated on constraining rather than embracing the player's status as an actor. But when we fully accept that status and all its implications, we obtain a means to mediate that tension and resolve the problems.

In this chapter I describe a schema for thinking about interactive storytelling and the respective roles and responsibilities of designer and player as contributors to an interactive story. I originally proposed the schema in "A New Vision for Interactive Stories" (Adams 2006a), a lecture at the 2006 Game Developers' Conference. The central insight conveyed in that lecture is that the player's status as an actor—a role-player—creates in him a joint responsibility with the designer to produce a coherent experience, and that the player's degree of responsibility is directly proportional to his interactive freedom. The designer and the player undertake an implied mutual agreement—a contract—to cooperate to produce a coherent story-like experience. If either violates the contract, he has no right to expect coherence from the other any longer.

The remainder of the chapter explores and argues for this schema in detail.

10.1 The Collaborative Nature of Experience-Creation

Game designers, in spite of all their long history working with interactivity, still regard players primarily as an audience, recipients of the entertainment that games provide. Jacek Wesołowski wrote, describing this misconception, “We often see ourselves as all-powerful creators of worlds. Our job is to present, and our players’ job is to admire.” (Wesołowski 2009) Designers build worlds for players to play in and mechanisms for them to play with. The play-activity must be entertaining and rewarding and it can even include creative play, if the designer offers the player opportunities to construct things or to express himself. But designers normally considers the player’s activity to be of a different nature than their own. The designer thinks of herself as building something permanent and immutable, a software product stamped onto a read-only compact disc. The player’s activities are mutable and ephemeral and, in a sense, of a lower order. What the designer does is work; what the player does is play. The fourth assumption listed in section 9.4—that the designer alone is responsible for the quality of the player’s experience—is rooted in this perspective.

It is true that most of a game designer’s job involves specifying the features of software, and that designing games bears little resemblance to playing them. But the conception of designer-as-software-builder and player-as-software-buyer obscures the actual point of all the designer’s effort: to create an experience for the player to enjoy and to participate in—a gameplay experience and, in storytelling games, a story-like experience. The designer may build the software, but the designer and the player build the experience together. As Bob Bates put it in “The Responsibility of the Author”:

> At the root of interactivity is the requirement that we make each player feel as if his game playing experience is unique... He needs to feel that he has individually contributed to the flow of events, that without him and his particular skills, things would never have turned out right, the great quest would have gone unfinished, and the master plan would have been left unfulfilled. (Bates 1996, p. 39)

In computerized media the designer can only contribute to the player’s experience at one remove, via the software, and this is the source of the misconception that a

designer is primarily a designer of software. The designer's true function is much clearer when the designer is the dungeon master of a conventional tabletop role-playing game. The dungeon master may spend hours by herself creating the game world in advance, but her most important contribution comes during play. During play, the designer sits in the same room with the players and facilitates their experience, and there is no question that the task of creating the experience is collaborative. A computer game designer is also a dungeon master of sorts, but her distance from the player in space and time obscures this truth.

A few designers also still hold the older and much more pernicious misconception that the designer is the player's opponent; that it is the designer's job to obstruct the player's progress and make life hard for him. I have already addressed this error in my textbook (Adams 2009, pp. 32–33) and so devote no more space to it here. I only note that such an attitude is not conducive to the creation of a satisfying story-like experience.

Much has been written about collaboration among players in multiplayer games, but the collaborative relationship between the designer and player is less well-understood. I do not have room in this thesis to develop the idea fully, but can only discuss that aspect of it which bears upon interactive storytelling. As I explained in section 3.1.3, the player experiences an interactive story as a sequence of events in real time, some of which are generated by computational processes, some of which may be narrated, and some of which are performed by the player himself. The player is an active participant in the process of creating his own experience. It is in this context that he is simultaneously actor, audience, and player. He enjoys playing and acting—performance itself is a source of pleasure—and he enjoys seeing the consequences of his actions and experiencing the story.

I do not mean to suggest that the player's involvement is so great that his participation makes him a co-creator of the story. The player contributes *to* the story and is a co-creator of his own experience, within whatever interactive range the designer has offered him. He adds actions and makes decisions, and if the system offers him agency he may add to or alter the plot—but all, and only, within a larger context established exclusively by the designer. Ordinarily, the designer alone has the

power to establish the setting of the story and the other characters in it. If the player's interactive range were to be so great that his power to affect the virtual world began to approach that of the designer, then the experience would no longer be one of role-playing but one of craftsmanship. It is possible to build software that offers this power, but such a system is beyond the scope of this thesis.

Janet Murray seconds this opinion:

> Some have argued (with either elation or horror) that an interactor in a digital story... is the author of the story. This is a misleading assertion. There is a distinction between playing a creative role within an authored environment and having authorship of the environment itself. (Murray 1997, pp. 152–3)

Collaboration literally means "working together". People who work together accept certain mutual obligations: to work toward agreed-upon goals, for example, and not to destroy or impede the other's contributions. Players play rather than work, but in an interactive story they do so in a particular way: as an actor playing a role. That they play rather than work does not absolve players from all responsibility regarding the experience. Their status as role-players confers obligations upon them.

10.2 Role-Playing as the Fulcrum of the Balance

In "A New Vision for Interactive Stories," I introduced a concept that I rather informally named *screwing around*:

> Screwing around is a style of play. It's free-form, chaotic, and largely unbounded by rules. It's an outgrowth of the ultimate freedom assumption [Assumption 1], and the "if you can do it, it must be allowed" assumption [Assumption 3]... Role-playing places limits on screwing around. (Adams 2006a)

Screwing around is related to Callois's concept of *paidia*, (Callois 2001, pp. 27–28) but screwing around connotes a degree of intentional wanton destructiveness perhaps not envisioned by Callois. I described the *Grand Theft Auto* games as the ultimate enablers of masculine screwing around. I then went on to ask,

> What are we actually obliged to provide to the player? Must an interactive story enable the player to do anything whatsoever, including screwing around? I would say no. Apart from the problem of having the resources to present "anything"... a story engine cannot handle the implications of

> absolutely any event. And the interesting thing is, *a human storyteller can't either.* If any of you have been dungeon masters, I'm sure that you, too, have been driven mad by your party screwing around. (Adams 2006a)

After introducing the kinds of laws that the designer may impose upon the player in a storytelling game (see section 9.5.3) I asserted:

> *The player must act in conformance with the role that he as agreed to play. He must accept the premise of the game, or our obligation to provide him with a coherent story is at an end.* If the player screws around, all bets are off, and it's not our fault. Requiring that the player actually play a role within the context of the story enables us to place expectations upon his performance.
>
> In other words, *we can mediate the eternal tension between interactivity and narrative, between the designer's desire and obligation to construct a coherent story and the player's desire for freedom, through their common agreement that the player will be playing a role.* If we try to create interactive stories with the assumption that every interactive story must be the ultimate sandbox that can handle any possible thing the player wants to do, we are setting ourselves up to fail. [Emphasis added.] (Adams 2006a)

Role-playing is thus the fulcrum of the balance between interactive freedom and well-formed stories. With freedom comes responsibility, and this adage applies whether we wish to collaborate in the creation of a well-formed society or a well-formed story. Player freedom does not destroy the designer's ability to deliver a well-formed story; rather, it imposes upon the player a responsibility to cooperate with the process. Indeed, the player's degree of responsibility for the story-like nature of his own experience rises in direct proportion to the degree of freedom that he has.

Of course, the designer does have the power to enforce coherency by constraining the player's freedom. If the designer gives the player little freedom, then clearly most of the responsibility for the experience lies with the designer. Many designers do this, and many players accept it. My point is that—contrary to the arguments of many other commentators—there is not one single correct way to approach the question. Rather, the designer should choose an approach that meets the needs of her project and the desires of her representative player.

10.3 The Designer/Player Contract

In "A New Vision for Interactive Stories," I described the relationship between the designer and the player as both collaborative and contractual. I explained the contract as follows:

> Treating interactive narratives as role-playing creates a contract between the designer and the player, such that the designer promises to provide a credible, coherent story if and only if the player promises to behave in credible, coherent ways. And if they don't, all bets are off. (Adams 2006a)

In essence, the designer offers the player a role to play, which may be defined to a greater or lesser degree of specificity. The designer also provides the player with a set of actions that the player may perform at various points in the story. The variety of these actions constitutes the player's interactive range. The more freedom the designer gives the player, the more opportunities the player has to depart from the role that the designer has created for him. If the plot, avatar, or world requires that the player behave in certain ways, but her available actions permit her to depart from those ways, then she has the power to subvert the story. The contractual relationship, however, requires that the player play the role wholeheartedly and in character, if the designer's contribution is to remain coherent also.

The contract is an agreement regarding mutual obligations, but it does not include any penalty for failure to perform. Rather, a breach of the contract—bad role-playing—simply ends the agreement. The role itself imposes not restrictions, but an expected framework of behaviour. It is for the player to decide how well he wishes to role-play, with the understanding that incoherent play on his part may produce incoherent results on the part of the game.

If the player plays coherently and the *story* behaves incoherently, then the designer has violated his agreement with the player, and the player may rightfully criticize him for it. This sometimes occurs when the software has a bug in it, such that the player encounters an absurdity. *Syberia II* (2004) allowed the player to discover the grave of a person who had died, yet offered the player dialogue options to speak about that person as if he were still alive. The designers did not expect the player to

discover the grave until after the dialogue had taken place, but in fact the player had enough freedom to do so.

10.4 Abandoning the Assumptions

In Chapter 9 I introduced four assumptions that I and many other game designers long held about the nature of an ideal interactive storytelling experience:

1. That an ideal interactive storytelling experience would maximize interactive freedom and agency, providing a sort of “ultimate sandbox” for the player to play in.

2. That an ideal interactive storytelling experience would not be a game in the formal sense, and probably would not have an internal economy.

3. That the player should not have to think about any rules, or otherwise exercise any self-control; such constraints as are absolutely necessary should be imposed by the software.

4. That the designer alone is responsible for the quality of the player’s experience, including its internal consistency and credibility as a story.

The new schema explicitly abandons all of these assumptions:

1. Player freedom and agency should *not* be unlimited, but should be defined consistently with the player’s role and the premise of the story itself—its setting. A player role-playing Robin Hood should not be able to use judo, for example, and to offer the player judo as an option would be incoherent of the designer.

2. Some player roles may include game-like activity (e.g. an interactive story about a detective, or for that matter a football star), and an internal economy may be useful in determining some of the player’s interactive range. An internal economy is certainly required to simulate non-static non-player characters.

3. The act of role-playing *does* require an exercise of self-control. If the player enacts a pre-specified avatar, and he has great interactive freedom, then he must limit his actions to those that conform to the avatar's nature (if he cares about the consistency of the story to which he is contributing).

4. Rather than lumbering the designer with sole responsibility for the player's experience, in my schema the burden of responsibility is shared between them.

Section 9.5 has already shown why these assumptions should be abandoned; the schema replaces them with a much more workable approach to interactive storytelling.

10.5 Why the Schema Matters

At first glance it may seem that the designer/player agreement to collaborate in creating a well-formed story-like experience, with the player's responsibility rising in proportion to her freedom, is obvious and not innovative. In fact, however, it represents a radical departure from the way in which the video game industry has traditionally approached the subject.

An example will illustrate the traditional perspective. In the interactive drama *Façade,* the player plays the role of an old friend of a married couple, Trip and Grace, whom he or she is meeting at their home for the first time in ten years. In "A New Vision for Interactive Stories" (Adams 2006a) I read out a transcript of a conversation recorded during a single play-through of *Façade*. At the beginning of the drama, the player claimed to have been shot prior to her arrival. The software responded to this incoherently: the simulated characters ignored the player's pleas for help, producing an incoherent (and very amusing) conversation. In another play-through not cited in the lecture, the player claimed to be pregnant and carrying Trip's baby. Again, Trip and Grace failed to react appropriately.

The natural reaction of many players and video game developers (and indeed my own first reaction) to these scenarios is to blame the software and its designers. Clearly, I thought, the artificial intelligence used to simulate the characters is not equal to its task. *Façade* is a prototype and it needs improvement.

This characteristic response is rooted in two of the faulty assumptions of chapter 9: Assumption 3, that the player should not have to voluntarily constrain her behaviour, and Assumption 4, that the designer bears sole responsibility for the quality of the player's experience. In fact, the player's behaviour in the cases I cited violated the contract to behave coherently, and the fault is squarely hers. By claiming to have been shot, the player violated the virtual world; the world contained no guns and included no concept of being shot. By claiming to be pregnant with Trip's child, the player violated the plot by ignoring an explicit premise of the game, that the avatar had not seen Trip and Grace for ten years. These activities breached the contract, so the designer's obligation to provide coherency also ended. But the video game industry is not used to thinking about interactive storytelling that way, and I claim this is why the schema was new when I introduced it in 2006, and why it is important.

In the lecture I observed,

> Going into *Façade* and saying, "I've been shot!" is *just bad role-playing*... We [designers]... are allowed to say, "No pretending to have been shot, when there are no guns in the game world." That is the understanding that dawned upon me this year. We have obligations to the player, but the player has obligations to us, through his participation as a role-player. (Adams 2006a)

(It is also possible to confuse the *Façade* dialogue engine *without* violating the designer-player contract, by introducing legitimate subjects of conversation, such as current affairs, for which the designers could not plan. It is, after all, an experimental work.)

10.6 Other Views

I am far from the first commentator to have discussed the status of the player as an actor; Callois wrote of mimetic play in 1958 (Callois 2001, p. 19), and in *Theatre Games* Clive Barker proposed that games could be used as a form of training for conventional stage actors (Barker 1977). Neither of these writers addressed the issue of the relationship between the designer (or playwright) and the player, however. In this section I cover the work of a few scholars that seems to me to be on point.

10.6.1 Laurel on Interactive Drama

No discussion of the player's status as a role-player would be complete without addressing Brenda Laurel's seminal works, *Toward the Design of a Computer-Based Interactive Fantasy System* (Laurel 1986) and her book *Computers as Theatre.* (Laurel 1991) Both of Laurel's works cited concern a hypothetical software system for generating interactive dramatic experiences. Laurel's minimum requirements for such a system were that it be interactive, produce in the player the pleasures associated with drama, and offer a first-person experience, i.e. an experience in which the player enacts a role in the drama. (Laurel 1986, pp. 9–10) Her system as described has never been constructed, but her ideas have influenced the work of others, most notably the Oz project at Carnegie-Mellon University and the *Façade* project of Michael Mateas and Andrew Stern.

Laurel addressed the player's status as an actor at length (Laurel 1986, pp 87–116), but she did not fully consider the relationship between the player and the designer, nor its consequences for the problems of interactive storytelling. Laurel's perspective was also constrained by her choice of drama as a metaphor for human-computer interaction. She explicitly chose drama and rejected storytelling (which she referred to as *narrative)* because restricting her hypothetical system's activity to dramatic forms simplifies matters. Drama, in her view, emphasizes activity, real-time experience, and the unity of action that the neoclassical critics derived from Aristotle. Laurel asserted that these qualities are desirable in interactive fictive experiences. (Laurel 1991, pp. 93–98) I have shown, however, that imposing Aristotelian ideas upon interactive storytelling is far too constraining. In "Interactive Narratives Revisited," I observed that literature has long since moved beyond the Aristotelian three-act restorative structure:

> Some of our greatest literature explicitly eschews this structure. *The Grapes of Wrath,* by John Steinbeck, for example, has a beginning but not an end, at least, in the sense that the end provides any resolution of the problem. *A Hundred Years of Solitude,* by Gabriel Garcia Marquez, does not have a central "conflict" or single point of dramatic tension. It's a long, meandering narrative through the lives of a large number of people... If we're content to tell folktales for ever, then we don't have to work very hard, but on the other hand we're not exploring the medium very thoroughly either. Storytelling has moved on since then. (Adams 2005a)

In “A New Vision for Interactive Stories” I observed,

> We might have multiple endings, which is not something that Aristotle talks about. We definitely have multiple middles. The player can save and reload in the middle of a story and create a new middle, if he wants to. We might even have multiple beginnings, if the game is randomized every time you play it... The three-act structure that Aristotle was talking about—setup, confrontation, resolution—was designed for *plays*. He was talking about drama on the stage, and it works for movies too, because movies are about the same length as plays. But it has nothing to do with an entertainment form that can last 40 hours, like a big video game. Nor does it have anything to do with an entertainment form that can last indefinitely, like a soap opera. (Adams 2006a)

Laurel argued that the limited duration of stage plays, which she believes interactive dramas should emulate, is a benefit rather than a constraint. Her justification is unconvincing, however, founded again as it is upon Aristotle and her own personal preference for shorter experiences. (Laurel 1991, p. 95) Aristotle was writing about a presentational form of entertainment for a large audience that must necessarily continue to its end in real time. He was not writing about a game that the player could pause and restart at will, nor about episodic forms—although Aeschylus’ *Oresteia,* a three-play trilogy that tells one long story, would have been known to him. Stage plays themselves have long since outgrown Aristotle’s prescriptions; the works of neither Shakespeare nor Shaw conform to them.

Laurel addresses the player’s status as an actor in the context of a discussion about why and how the player must be constrained in various ways. (Laurel 1986, pp. 101–116.) But she did not recognize (or perhaps did not accept) that the player is jointly responsible with the designer for the quality of the experience:

> The system must be able to create, through the plot, lines of probability that will draw the user away from “fatal” mistakes. While it cannot be asked to prevent acts of perversity or vandalism on the part of the user, and even though some willingness on the part of the user to cooperate with the system can be assumed, the system is solely responsible for guiding the action in a dramatically interesting direction. (Laurel 1986, p. 27)

Such willingness to cooperate, of course, cannot be assumed at all, players being what they are. The question that has plagued the debate from that day to this is what

to do about it. I have shown that there is not one correct approach; rather, it is for the designer to choose an approach suitable to each interactive story that she creates.

Laurel went on to assert that the software must be the "master of the plot" and "have control of the form the experience may take" (Laurel 1986, p. 29) because otherwise the player will be distracted from the pleasure of acting by the work of developing the plot. But as I explained in section 10.1, players in an interactive story are not co-creators of the story, and don't think of themselves as such. They simply act, sometimes reacting to plot events that the game generates, and sometimes generating plot events of their own. One of the premises of Laurel's project was that an interactive drama system must make the player's experience of the world dramatic (Laurel 1986, p. 21), but she explicitly rejected the idea that the player had any responsibility in the matter.

I am not personally hostile to the idea of Aristotelian drama as a model for some kinds of interactive stories, and in fact I am an ardent admirer of *Façade.* (Adams 2005b) In my lecture "Interactive Narratives Revisited" I devoted several minutes to discussing the merits of studying and experimenting with interactive drama, particularly as regards dialogue and interactions among characters. (Adams 2005a) Interactive drama based on Aristotle is one way to do interactive storytelling. But as with all the other arguments about interactive storytelling, I reject any assertion that Aristotelian drama is the "right" way to do interactive storytelling. Practitioners risk painting themselves into corners if they insist upon interactive drama to the exclusion of all other approaches to interactive storytelling.

10.6.2 Mateas's Balance

Michael Mateas's PhD thesis introduces his work on *Façade* and sets it in a context of what he calls a neo-Aristotelian theory of interactive drama. (Mateas 2002, p. 22) Mateas's work is significantly influenced by Laurel's ideas, upon which he expands. Mateas is careful to point out that he does not assert the superiority of Aristotelian drama over other forms of interactive storytelling.

Building upon Aristotle and Laurel, Mateas makes a distinction between the *material constraints* and the *formal constraints* upon the player in a role-playing context. By

material constraints he in effect means the limitations upon the player's interactive freedom imposed by the material limitations of the virtual world itself—if the world offers few things with which the player can interact, or few ways in which he can act, he is materially constrained. By *formal constraints* Mateas means the designer's intentions for the experience in general, which includes the design of the world, any predefined plot events that the designer has imposed, and the designer's definition of the player's role.

Mateas regards agency as the most essential quality of an interactive story, and he asserts that "A player will experience agency when there is a balance between the material and formal constraints." (Mateas 2002, p. 27) In effect, the player will feel as if he has agency when the interaction opportunities that the game affords are well-matched by the designer's plans for the drama. He cites *Quake* (1996) as a good example (the player's only available action is to kill everything in sight, but that is all the designer had in mind) and *Zork: Grand Inquisitor* (1997) as a poor one—the player has a great deal of interactive freedom but little sense of what to do with it because the designer has given him little guidance about the nature of the plot. The player's freedom does not contribute to a sense of engagement with the plot, and even if he *has* agency, he is not aware of it.

There is a good deal to be said for Mateas's insight as guidance for video game designers. If the designer wishes to create a strong sense of agency in an interactive story, the player's level of interactive freedom should be well-matched to the role that he is to play and the story in which he will participate. Simply wandering around a large world does not create a sense of agency because the player does not encounter plot events often enough, or recognize them as such when he does. However, Mateas does not actually seek to resolve the problems of Chapters 6–8 by this means. *Façade* did, in fact, allow the player enough freedom to behave incoherently, and it did produce incoherencies itself as a result, as I described in section 10.5. But Mateas does not address the subject explicitly in his thesis.

10.6.3 Crawford's Drama-Scoring System

Chris Crawford argued that the players should be allowed to do anything within reason, as described in section 6.4.2, but instead of a contract between the player and

designer, he proposed that the game should guide the player towards dramatically interesting activity by means of a score. In *Chris Crawford on Interactive Storytelling*, Crawford proposed that the game should track the player's actions and award positive or negative points to the player for making dramatically interesting or dramatically dull choices, respectively. The player would not be aware of the actual numeric value, but it would be converted into a certain amount of applause (or booing) from a virtual audience. (Crawford 2004, pp. 212-216)

Crawford's suggestion is an interesting one, but it only applies to a limited domain of interactive stories: those with a virtual audience. Crawford's proposal appeared in a discussion about drama managers (a type of software system to which *Façade* also belongs), which he finds appealing as a model for storytelling. Most interactive stories do not have a virtual audience (the player is the audience), and the intrusion of applause or booing is bound to remind the player of the fourth wall and destroy his immersion in the story.

More seriously, a scoring system for drama does not allow the player to role-play his character as he thinks best. It relieves him of some of his responsibilities as a collaborator with the designer by effectively telling him the right way to act his part. Crawford has objected that adventure games smell like primrose paths because they limit the player's freedom of action (Crawford 1984), but a scoring system that rewards dramatically interesting behaviour and punishes dramatically dull behaviour just sets up another primrose path. In effect, instead of raising gameplay to the status of drama, his proposal reduces drama to the status of gameplay. Worse, if the scoring system is known to the player, it is bound to destroy narrative immersion.

10.6.4 Young's Contract

The idea that the player and the designer engage in a contract was not original with me. In "The Cooperative Contract in Interactive Entertainment", R. Michael Young argued that the player and the designer cooperate much as speakers do in a conversation, and as readers do with an author. In his view, the parties agree to a common set of expectations about the meaning both of what is said and what is left unsaid. With respect to interactive stories, Young observes,

> For the designer of a narrative-oriented game that allows substantive user interaction, the greatest design challenge revolves around the maintenance of the co-operative contract, achieved by the effective distribution of control between the system and its users. (Young 2002)

And later in the same paper,

> The role of the gamer in a typical computer game is not one of director, but rather of lead character. She does not enter the game world omniscient and omnipotent, but experiences the story that unfolds around her character through the eyes of an audience member, the eyes of a performer and through the eyes of her character itself. To uphold her portion of the co-operative contract, she must act well her part, given her limited perceptions and capability to change the game environment. (Young 2002)

Young's contract and mine are not exactly alike, however. Young wrote in his abstract, "I propose that a co-operative contract exists between computer game players and game systems (or their designers) that licenses both the game players' and the game designers' understanding of what components of the game *mean*." (Young 2002) [Emphasis in the original.] By contrast, I conceive the contract as chiefly concerning the designer's and player's respective responsibilities to one another: "The designer promises to provide a credible, coherent story if and only if the player promises to behave in credible, coherent ways." (Adams 2006a)

An even more important difference lies in how each of us interpreted the consequences of the existence of such a contract. Young felt that the contract compelled a particular approach to interactive storytelling:

> Consequently, the system creating the storyline behind the scenes *must* bear most of the responsibility for maintaining the work product of the collaboration, i.e., a coherent narrative experience. To do this, it *must* plan out ahead of time an interesting path through the space of plot lines that might unfold within the game's storyworld. In addition, the game itself *must* keep constant watch over the story currently unfolding, lest the user, either by ignorance, accident or maliciousness, deviate from the charted course. (Young 2002) [Emphasis added.]

Young's viewpoint is still rooted in Assumption 3, that the player shouldn't have to think about any rules (i.e. voluntarily constrain his behaviour), and Assumption 4, that the designer is entirely responsible for the player's experience.

My own notion of a player-designer contract was independently invented, and for a very different reason: I sought to unify *all* approaches to interactive storytelling into a single conceptual framework governing the relationship between the designer and the player, and moreover, to establish that the player possesses a degree of responsibility for the quality of his own experience. As I explained in section 10.2, the player must accept the premise of the story and act in conformance with the role that he has agreed to play. In my framework, the need for mutual agreement about what components of the interactive story mean is implied; clearly, coherence is impossible without it. Rather than conclude, as Young did, that the contract necessitates the creation of AI-based, real-time procedural storytelling systems, I concluded that the contract governs all interactive storytelling systems however they are implemented. It does not impose an approach on the designer, but establishes a schema for thinking about design.

10.6.5 Other Commentators

Others have also envisioned the relationship between the designer and player as a contractual one, although the terms of the contract differ. Andrew Glassner argues for a three-clause *story contract*. Clause 1 states that the author is responsible for the psychological integrity of the main characters; clause 2, that the author is responsible for the sequence and timing of major plot events; and clause 3, that the audience must allow itself to be emotionally moved. (Glassner 2004, pp. 118-120) This approach clearly privileges the designer's role in defining the story experience and suggests an approach to interactive storytelling that is close to traditional authorship. Glassner's clause 2 denies the player any agency over the plot, while my contract does no such thing, leaving decisions about how much agency the player should have to the designer.

Many scholars have examined the relationship between real players and their virtual identities, and found that players exhibit a considerable variety of attitudes. To quote only one example, Jonas Linderoth's empirical study showed that children relate to their avatars in at least three ways: as a character to enact or role-play; as a tool that affords the player interactive freedom in the game world; and as a prop through

which players can express their own characters. More importantly, the players sometimes switch among these viewpoints. (Linderoth 2005)

The multifaceted nature of the player-avatar relationship has led some commentators to conclude that designers should not try to offer to their players experiences in which the role-playing relationship predominates. Marie-Laure Ryan bluntly dismisses what she calls “the holodeck myth”, basing her judgement upon an unfounded assertion that players who role-play a character in their own person must feel the pain of characters such as Hamlet and Emma Bovary literally. She therefore concludes that the holodeck is unsuited to such characters and their plots. (Ryan 2001) But there is no reason to think that a player enacting a role in the holodeck feels pain any more literally than a Method actor does upon a stage, and whatever pain Method actors do feel certainly does not deter them from playing those kinds of roles. Furthermore, many players would be delighted to have the opportunity to role-play Hamlet with agency over the plot, to act otherwise than Shakespeare’s Hamlet did just to see what would happen. Most who tried it would probably violate Hamlet’s character, but Shakespeare left us no explicit instructions about how Hamlet should behave, and it’s possible that a sufficiently brilliant player might enact a version of Hamlet who was even more compelling than Shakespeare’s.

In her later book “Narrative as Virtual Reality: Immersion and Interactivity in Literature and Electronic Media”, Ryan had what looks at first glance (and taken out of context) like a similar insight to my own:

> To ensure a felicitous integration of the bottom-up input of the user into the top-down design of the system, interactive drama may take a clue from the game of the Big Bad Wolf discussed in chapter 9 [of her book]. In the game, children are free to improvise, and they do so for their own pleasure, but their improvisations are controlled and coordinated by a familiar narrative scenario that the players agree to implement. If there is a lesson to learn from children's games of make-believe, it is the advantage of familiarizing the players with the script, and the importance of counting on their voluntary cooperation. The interactors should know that their personal enjoyment depends on a collaborative effort to enact the narrative. (Ryan 2003, p. 320)

Because Ryan’s proposal calls for familiarising the players with the script—presumably, the entire story—in advance, it is not really the same as the schema that

I offer here. I don't believe that the player needs to know an entire story in advance before beginning to improvise around it; the player only needs to know the nature of the character she is to enact and the world in which she is to play. Furthermore, in my schema the player's personal enjoyment of a well-formed story is only at stake to the extent that the player cares about the well-formedness of the story in the first place; if the player has great interactive freedom, it is up to her to decide how consistent with the story her role-playing will be. Ryan's comments pertain to participants' obligations to to each other, rather than a single player's relationship with the designer.

In *Rules of Play*, Salen and Zimmerman posit that game designers' desire to offer highly-representational, high-agency role-playing experiences is somehow detrimental to game design itself. The designers who want to offer this to their players, Salen and Zimmerman claim, delay the public acceptance of video games as a significant form of culture, because such games ignore the multifaceted nature of player-avatar identification. (Salen & Zimmerman 2004, p. 455) These authors assert —without offering any basis for the claim—that public acceptance will come more quickly if game designers adopt the same kind of self-referential, frame-breaking (and therefore immersion-destroying) content to be found in hip-hop, fashion, and animé.

We may dismiss Salen and Zimmerman's argument from political expediency with no more than an observation that creative people of serious intent seldom constrain their work for the purpose of improving public opinion of their medium as a whole. The greater flaw in Salen and Zimmerman's argument arises from the rather obvious disanalogy between the media they cite and interactive storytelling: neither hip-hop concerts, nor fashion shows, nor animé films are participatory activities. Audiences for presentational material may more easily tolerate immersion-destroying content than game players do. A passive audience has not expended any effort, and in any case has no choice in the matter; its members do not jointly contribute to the experience. But some players undoubtedly dislike being forcibly reminded of the fourth wall while they play a game, and this preference is no less valid than any

other. Furthermore, the designer-player contract alluded to in my schema prohibits frame-breaking by the designer if the player may regard it as incoherent.

What Salen and Zimmerman denigrate as “the immersive fallacy” (Salen & Zimmerman 2004, p. 455) is in fact a well-founded awareness in the game industry, based on decades of experience, that some players *like* highly-representational environments and losing themselves, to the greatest extent they can manage, in their roles. This is not to suggest that players do not like more abstract games; *FarmVille* (2009) has more players than *Far Cry 2* (2008). But *FarmVille’s* success is hardly a reason to assert that games like *Far Cry 2* should not be made, or that what *Far Cry 2* offers the player is somehow inferior because it seeks to supply a self-contained world and role into which the player can immerse himself.

Ultimately, neither Ryan’s nor Salen and Zimmerman’s arguments are of much value to the practising designer. Players will adopt whatever relationship to their avatar they find most comfortable, pleasing or efficacious. A designer cannot compel immersion, and he can only with difficulty compel a player to stay in character; but this is no reason to deny the opportunity to those players who want it. Designers should choose the sort of experience they want to offer to their players based upon their goals for their project, which, in a well-designed game, includes a clear understanding of their representative player’s desires.

10.7 Critique

While I consider my analysis of the collaborative relationship between player and designer, and its implications, to be generally sound, I do recognize that there are two considerations that “A New Vision for Interactive Stories” (Adams 2006a) did not address.

10.7.1 Does Role-Playing Destroy Immersion?

Does the process of carefully enacting a character so as to ensure consistency with the character’s original specification destroy the player’s immersion in the experience? Gonzalo Frasca has asserted (Frasca 2004) that it does. Perhaps for this reason, in designing *Façade*, Mateas and Stern intentionally avoided specifying the player’s avatar in significant detail. One of their stated goals for the experience reads:

> *Player's role not over-constrained.* The amount of non-interactive exposition describing the player's role should be minimal. The player should not have the feeling of playing a role, of actively having to think about how the character they are playing would react. Rather, the player should be able to be themselves as they explore the dramatic situation. (Mateas 2004a, p. 30)

I believe that Frasca's assertion misses the point of experiences in which the player enacts a highly-specified character. The feeling of playing a role is part of the experience that the designer intends for the player to have; otherwise, the designer would not have specified the role to so high a degree. If the premise of an interactive story states that I will play the role of Gandhi (a highly-specified character) in a virtual world full of guns, I know that I must play my role without using the guns. The exercise of self-control that I experience—the need to behave like Gandhi—does not destroy my immersion; it is *part* of my immersion, a feeling that the designer wanted me to experience. Ideally, a player will embrace, rather than resist, the role offered; otherwise, why play it at all?

The designer will decide to what degree to specify the avatar based upon, among other things, what kind of a player she is building the experience for. Craig Lindley argues that not enough effort has gone into studying player preferences about interactive storytelling experiences:

> A second and perhaps surprising factor in the discussion about the relationship between gameplay and narrative is that the issue has not generally been considered in relation to the preferred play/interaction styles of players. The "tension between game play and narrative" is manifest in statements like "cut scenes break immersion in the game" or "the game play is repetitive and has nothing to do with the story". Another player referring to the same game may find its strategy for intermixing story and narrative to work perfectly well. (Lindley 2005, p. 155)

Lindley went on to discuss a variety of what he called "story-oriented player preferences." He proposed to divide story-oriented players into three broad categories: *audience style* players, who like to be narrated to and care little or nothing about agency; *performers,* who like to play with highly-specified avatars and perform in those roles; and *immersionists,* who like to devise and specify avatar characters of their own. (Lindley 2005, p. 178) I do not examine these categories further here, as I feel that the best way to determine their accuracy and value is

through empirical research; but clearly players in his performer category would not find that the act of role-playing harms their experience.

10.7.2 What If the Player Breaches His Responsibilities Unintentionally?

In an ordinary collaborative *working* relationship, the parties should be aware of their common goals, and they should make a mutual agreement about how to achieve those goals before they set out. This does not always happen, of course, and the results usually speak for themselves; but that is the ideal. The nature of the player-designer collaboration, on the other hand, is complicated by the fact that the player does not know how the plot should develop (if the plot is partially or entirely predefined) or what experience the designer has in mind for him. He knows that he must accept the premise of the story and the role he is to play, but he cannot know the consequences of every action that he takes. The collaboration is not analogous to a collaborative effort to, for example, build furniture. When building furniture, both parties should have access to the plans in advance, but when when building a story-like experience, the player should not have access to the plot in advance. So it is theoretically possible for the player to impede or violate the plot without even knowing that he is doing so. If he wanders around without ever performing the necessary precursor actions that lead to the dramatic climax, it may be because he doesn't know what they are. If he destroys a car in Act I that the designer needs for a plot event in Act IV, that isn't the player's fault. He has violated the plot, but not intentionally.

The game *Interstate '76* provides an example. The primary activity in the game was driving a car armed with various weapons, including land mines. The mines would blast any vehicle that hit them into the air. In one of the levels the player was told to find his way out of an area enclosed by a wall. Unbeknownst to the player, the linear plot required that the player locate a hidden ramp and use it to jump over the wall. However, players discovered that they could also exit the area by dropping a land mine near the wall and then driving over it at speed. The force of the blast would raise the car higher than the wall, and the car's momentum would carry it over, thus fulfilling the stated victory condition for the level.

Unfortunately, if the player did not use the ramp, the software did not recognize that the player had accomplished the victory condition, which was to get out of the area. The plot stalled, because it required that the player jump via the ramp (and into a pit, of which he was unaware). By using the land mine trick, the player accidentally obstructed the plot, and the dramatic climax could never occur, leaving the player to drive endlessly and pointlessly around the area outside the wall.

The Problems of Internal Consistency and Narrative Flow were originally described in such a manner that they assumed a wilful recalcitrance on the part of the player. But as the *Interstate '76* example shows, the player can also cause problems through his entirely reasonable and natural ignorance about the consequences of his actions.

My answer to the question, "What if the player breaches his responsibilities unintentionally?" hinges first upon a distinction that I made at the beginning of chapter 6, The Problem of Internal Consistency. I noted that the player may act incoherently in three ways: violating the plot, violating his avatar's character, and violating the game world (through the introduction of inappropriate content). In the case of the latter two, the player should have enough information to avoid transgressing in these ways by accident. If the designer gives the player a proper introduction to the avatar's character and to the virtual world (see chapter 5, The Problem of Amnesia, for discussion of introductions), then the player will not be ignorant of the framework of his expected behaviour. This introduction is the designer's responsibility; having made it, however, coherently role-playing the avatar within the world is the player's responsibility.

The designer is responsible for the performance of the game engine at all times. If the player violates the plot (the remaining form of inconsistency) or obstructs the plot (the Problem of Narrative Flow) through ignorance, the designer has failed; there is a bug in the software. In a game whose plot is fully or partially predefined, it is the designer's responsibility to ensure that the player cannot violate the plot, inadvertently or otherwise. This need not take the form of restricting the player's freedom, however. The *Grand Theft Auto* games gave the player a great deal of freedom, but the player could not, either intentionally or unintentionally, destroy an item required by later plot events. The car required in Act IV was simply not in the

game world at all prior to Act IV—it did not exist. Thus, the player's ignorance about the car's importance created no risk to the plot.

The *Interstate '76* car-over-the-wall problem was clearly a designer error, which could have been prevented in a number of ways. The land mines could have been made so powerful that they destroyed the car, thus preventing the player from using them as tools (but thereby reducing interactive freedom). The player could have been told explicitly that he must find a hidden ramp and that no other solution would do; or the wall could simply have been higher—an initial condition of the world over which the player is not entitled to expect any power. The best solution, however, would have been to make the plot more flexible. The designer could have written the plot in such a way that *any* means of getting over the wall fulfilled its requirements (which would have preserved freedom). This last solution puts a greater burden on the designer, but is the most desirable for the player, if the player wants freedom. Any of these solutions would have prevented the player from unintentionally obstructing the plot.

In complex game worlds in which the player has a lot of freedom, it may not be possible for the designer to anticipate the consequences of all player actions. In such a case it would be better to use a game engine that procedurally generates plots rather than to use a predefined plot. Such a system should, ideally, be able to respond appropriately to any player action the system affords. When someone succeeds in creating a game with a fully emergent plot it will not be possible to violate the plot at all because such plots will be products of computation.

The player-designer collaboration is not a collaboration of equals, because the designer holds most of the power and is responsible for the majority of the experience. The relationship between them is not that of two people building furniture, but that of the dungeon master and a player in a table-top role-playing game. In a computer game the designer's participation occurs only via the computer software, which produces difficulties of its own, but does not relieve the designer of his responsibilities. If the software cannot rewrite the plot when the player violates it (perhaps because the plot is pre-defined), then it is up to the designer to see to it that the player has no power to influence plot-critical entities or situations.

10.8 Summary

In this chapter I have introduced and discussed the schema that I proposed in "A New Vision for Interactive Stories" (Adams 2006a): that the player's status as an actor in the story creates for her a joint responsibility with the designer for the dramatic quality of the player's experience. In particular, the player is responsible for enacting her role in a manner that maintains internal consistency and does not obstruct the plot. Her level of responsibility is directly proportional to the amount of interactive freedom that the designer gives her. The designer is not obliged to set any particular amount of interactive freedom; that is a matter of design choice and a function of the designer's goals for the experience. The designer *is* obliged to ensure that the player cannot accidentally violate or obstruct the plot, however, and may do so either by constraining the player's freedom or by keeping plot-critical items away from the player until an appropriate time.

The player enjoys a collaborative relationship with the designer as joint manufacturers of the player's experience, and the relationship is contractual in the sense that all collaborative relationships are: the two parties accept mutual obligations to cooperate and not to damage one another's efforts. The designer necessarily has most of the power and bears most of the responsibility; the player's responsibility is for enacting her own role. Should either designer or player fail, the other's responsibility comes to an end.

11 Resolving the Problems

I have shown that these Problems of Internal Consistency and Narrative Flow are based upon faulty assumptions and a poor construction of the player's relationship to the designer. The collaboration schema I introduced in "A New Vision for Interactive Stories" (Adams 2006a) corrects these errors and provides a way to mediate the tension between the player's desire for freedom and the designer's desire (and obligation) to deliver a well-formed story. This chapter explains and discusses my conclusions in detail.

11.1 Resolution to the Problem of Internal Consistency

A player who has a great deal of interactive freedom in an interactive storytelling experience has the power to behave incoherently with respect to the story, either intentionally or by accident, in one of three ways: by violating the nature of the character that he is role-playing; by violating the nature of the game world; or by violating the plot itself. This incoherent behaviour can disrupt the story-like quality of the experience that the designer intended for the player to have.

Some exceptions exist for particular cases. If a player defines his own avatar character before the story begins, the player cannot violate the character's nature; the character's nature is entirely his to determine. The same is true if the avatar is immutable, but largely unspecified by the designer, as in *Half-Life* (1998). If the plot is entirely emergent rather than predefined, the player cannot violate the plot because plot events arise as a result of computations rather than designer planning. In a fully-emergent plot, whatever happens is supposed to happen—assuming, of course, that the plot-generation mechanism is sufficiently robust to prevent absurdities.

I have already shown in section 10.7 that it is the designer's responsibility to prevent accidental violations of the world and the character by adequately introducing the player to the game world and to the role that he will play. It is also the designer's responsibility to prevent accidental violations of predefined plot events, either by constraining the player's interactive range or by making sure that the critical people, items, or other states of affairs required by those events are beyond the player's

influence. What remains to be resolved are intentional, rather than accidental, violations of plot, character, or world.

The Problem of Internal Consistency arises from the faulty assumptions listed in Chapter 9—particularly Assumption 1, the belief that the designer must maximize player freedom and agency, and Assumption 4, the belief that the designer alone is responsible for the quality of the player's experience. As I have shown, my schema abandons these assumptions. The Problem of Internal Consistency ceases to be a problem when we accept that the player has a degree of responsibility for the quality of his own experience.

Table 1 illustrates the various possible violations of internal consistency, and who bears responsibility for them under the role-playing schema.

	Character Violations		Plot Violations		World Violations
Player Behaviour Causing Inconsistency	Un- or Player-Specified Avatar	Designer-Specified Avatar	Fully or Partially Predefined Plot	Procedurally Generated Plot	
Intentional	N/A	Player	Player	N/A	Player
Accidental	N/A	Designer	Designer	N/A	Designer

Table 1: Responsibility for maintaining internal consistency.

The designer may enforce consistency by offering the player few options to depart from the prescribed role, but with a larger interactive range, it is the player's responsibility to behave appropriately if he wants a coherent experience. In some circumstances, it is difficult for the designer to prevent inconsistent behaviour. If the designer allows the player to speak or type sentences, the player can insert all kinds of language into the experience that violates the world and the avatar.

One might object that this formulation does no more than privilege player freedom, as described in section 6.4.2; that it simply comes down to "if the player wants to behave incoherently, he should be allowed to." There is a critical difference, however. Most arguments in favour of privileging player freedom also encourage

designers to avoid including any story content that the player *can* violate. My formulation does not oblige the designer either to give or to withhold freedom and agency, nor to limit herself to certain types of stories. Rather, it is for the designer to choose how much freedom and agency to provide, with the understanding that the more freedom she offers, the more she must do to prevent *accidental* inconsistencies, and the more the player must take responsibility for the consequences of introducing *intentional* ones.

11.2 Resolution to the Problem of Narrative Flow

If a player has considerable interactive freedom in an interactive storytelling experience, it may be possible for the player to obstruct the plot of the story, evade its dramatic climax, or fail to perform the necessary precursor actions required for the dramatic climax to be coherent when it occurs. This is the Problem of Narrative Flow. The problem can occur both in linear and in manifold stories.

11.2.1 Designs That Preclude the Problem of Narrative Flow

As I explained in section 7.4, the existence of the Problem of Narrative Flow depends upon a certain assumptions that were not explicitly stated in "The Challenge of the Interactive Movie" (Adams 1995) where I first defined defined the problem. The Problem of Narrative Flow cannot occur at all if the interactive story is constructed in any of the following ways:

- **No single dramatic climax.** The story has no single dramatic climax in the Aristotelian tradition. It may, instead, consist of an extended series of interrelated (and sometimes unrelated) dramatic moments. Soap operas work this way; rather than telling a single story with one dramatic climax, they present an endless sequence of small stories.

- **Reduced freedom.** The designer does not give the player enough interactive range to avoid the necessary precursor events and the dramatic climax. In this case the story includes a linear or branching plot that the player does not have the power to obstruct or depart from; he *must* experience the plot events and the dramatic climax. Many games adopt this model, and it is satisfactory to some, although not all, players.

- **Player-independent plot advancement.** The software advances the plot in ways that do not depend upon the player, e.g. through the advancement of time itself. The classic example is the ticking time bomb. The intended climax of the story is for the player to find and defuse the bomb in time; if he does not, it goes off. The dramatic climax is coherent either way, and the player cannot obstruct it because his interactive range does not extend to halting or reversing time itself. Note that this proposal is not the same as lack of agency. The player may still have the power to influence events to change the future, but he cannot obstruct the plot itself; it proceeds even if he does nothing at all. *Night Trap* used this mechanism and offered the player a degree of agency.

- **Procedurally-generated plots.** The story's plot and dramatic climax are not predefined, but procedurally generated based upon the player's actions, i.e. the plot of the story is emergent. Much work remains to be done on procedural storytelling so as to guarantee that it produces credible plot events at an an acceptable pace, but that is beyond the scope of this discussion. For the moment I only postulate that a successful interactive story with an emergent plot, when one is finally created, will adapt the plot automatically to the player's actions, thus guaranteeing a story-like pace and a coherent dramatic climax, and avoiding the Problem of Narrative Flow. Young and Riedl's MIMESIS (Young 2003), Magerko and Laird's IDA (Magerko 2004) and Barber and Kudenko's GADIN (Barber 2007) represent significant contributions in this field.

Having eliminated those interactive storytelling mechanisms from consideration, those mechanisms that remain troublesome are those providing high-freedom experiences (with or without agency) with predefined plot events and dramatic climaxes that depend upon the players performing the necessary precursor actions. In this case the plot cannot advance without the player's participation. If the player has the freedom to avoid taking the necessary actions, the plot will stall and the experience will stop feeling story-like.

At this point, as with the Problem of Internal Consistency, we must differentiate between circumstances in which the player, exercising his interactive freedom, unintentionally obstructs the plot and those in which the player does so deliberately.

11.2.2 Accidental Obstruction

As I demonstrated in section 10.7, if the player unintentionally obstructs the plot, the designer is responsible. The designer knows what the predefined events of the plot are and when they should occur, and the player does not. In his chapter "Keeping the Player on Track" of *Game Writing: Narrative Skills for Videogames* (Bateman 2007), Chris Bateman proposed a number of techniques with which to correct a situation in which the player has stalled the plot. If the player can render the dramatic climax incoherent by accidentally skipping necessary precursor events, the designer has made a serious error.

In this case the Problem of Narrative Flow is not an intractable, foundational problem as I originally described it in "The Challenge of the Interactive Movie." (Adams 1995) Rather, it is a design and technology challenge for the developers. The designer must use the tools at his disposal to construct software that delivers a well-formed story that the player cannot unintentionally obstruct.

11.2.3 Deliberate Obstruction

The last remaining case to be resolved occurs when the player intentionally obstructs the plot in a high-freedom interactive story with predefined player-dependent plot events. For this we must turn again to the schema. The player's status as an actor imposes upon him a partial responsibility for the quality of his own experience—especially where his own freely-chosen actions are concerned. If he deliberately avoids performing the events required to cause the plot to advance, thereby stalling the plot and making the experience less story-like, it is because he chooses to do so, and must accept the consequences. Once again, with freedom comes responsibility. The Problem of Narrative Flow, like the Problem of Internal Consistency, arises from faulty assumptions, most particularly that the designer is obliged to maximize the player's freedom and agency, and that the designer is solely responsible for the quality of the player's experience. But the designer is not obliged to give the player the freedom to obstruct the plot or render the dramatic climax incoherent; and if the

designer does give the player that freedom, the player rather than the designer is responsible for its use.

12 Other Contributions

This chapter explores several additional contributions that I have made to the literature of interactive storytelling.

12.1 Overloading of the Term *Conflict*

Hollywood screenwriters use the term "conflict" to refer to the essential problem of a story. (McKee 1999, pp. 210-213) In "Interactive Narratives Revisited" I observed:

> In this formulation, there are three kinds of conflict: interpersonal conflict, conflict between a person and their environment, or simply internal conflicts among a person's emotions or desires.
>
> Unfortunately, games are often seen in terms of "conflict" also—whether it's immediate and direct, as in a war game, or more theoretically, as in a conflict of interests between players in an economic simulation. In formal game theory, a "game" is defined as a situation in which there is a conflict of interests.
>
> The fact that we use the same words for both encourages us to think that they are analogous, and this leads us into error. I think the Hollywood formulation is too limited. Maybe it works for movies, but I don't think it works for all literature. I prefer to use a term that I learned in junior high school English class, *dramatic tension*. Dramatic tension is more general than "conflict" and it avoids this spurious emphasis on the opposition of forces. (Adams 2005a)

I am not alone in this preference; in *The Process of Drama,* John O'Toole writes, "A common but simplistic and largely discredited view places *conflict* as the basis of all dramatic tension. This view flourished during the early days of the development of drama in education, and led to forms of practice full of torrid and stultifying confrontations and slammed classroom doors. Conflict certainly is a significant component of dramatic tension, but by no means the only, nor even the primary source." (O'Toole 1992, p. 28)

In the next section I address the problem that this overloading creates.

12.2 The False Analogy Between Dramatic Tension and Gameplay Tension

In "Interactive Narratives Revisited" (Adams 2005a), and also in my Designer's Notebook column "Dramatic Novelty in Games and Stories" (Adams 2004b), I

suggested that game designers have been led astray by a faulty analogy between dramatic tension and gameplay tension, caused in part by using the term *conflict* to refer to both.

Salen and Zimmerman make this analogy in *Rules of Play*:

> Uncertainty is another requisite quality of meaningful play. If a game is certain, if the outcome is known in advance, there is no reason to play in the first place. But uncertainty is also a narrative concept, for the element of the unknown infuses a game with dramatic tension... The dramatic tension of Poker, too, gains its bite from the uncertainty of outcome. Bluffing contributes to the narrativity of the experience, heightening the potential for deceit. (Salen & Zimmerman 2004, p. 388)

By asserting that "the element of the unknown infuses a game with dramatic tension," Salen and Zimmerman refer to dramatic tension as if it were the same thing as gameplay tension, and by saying that "bluffing contributes to the narrativity of the experience," they seem to suggest that *any* game experience involving uncertainty is narrative in nature (using a more complex definition of *narrative* than mine).

12.2.1 Definitions of Dramatic and Gameplay Tension

Dramatic tension refers to the suspense an audience feels when experiencing a compelling story—the desire to know what will happen next. Authors create dramatic tension by engaging the audience's interest in characters or events and establishing a situation in which something that the characters, and the audience, consider to be of value, is at risk. O'Toole characterizes it as "the gap between the characters and the fulfillment of their purposes" (O'Toole 1992, p. 27), but he was writing specifically about stage plays. There is also dramatic tension in wondering, for example, whether a natural disaster has killed a character who was asleep and entirely unaware of the the danger he was in; in this example no one's purpose is involved. In any case, dramatic tension is required for any well-formed story.

I introduced the term g*ameplay tension* in "Bad Game Designer, No Twinkie! III": "…all games require a goal, something that the player is hoping to achieve, which creates what we might call 'gameplay tension.'" (Adams 2002a). That may have been the first use of the term in the literature; the next one I can find occurred in a

review of the game *Resident Evil Gaiden* (Lai 2002). I explained my meaning further in "Interactive Narratives Revisited":

> Gameplay tension arises from the player's immersion in the game, his commitment to advancement, his desire to win. There is gameplay tension in wondering whether the roulette ball is going to drop in slot 17 or not. Even in chess, a game of perfect information with no element of chance, the gameplay tension arises from wondering what your opponent is planning to do, and wondering whether she is smart enough to figure out what you're planning to do. (Adams 2005a)

In "Dramatic Novelty in Games and Stories", I also noted, "In a game, the resolution of gameplay tension is an action taken by the player to overcome a challenge created by the game designer. Sometimes the player succeeds; sometimes he fails and has to try again." (Adams 2004b)

Dramatic and gameplay tension are superficially similar because each involves the audience's engaged concern about the future. I first noted this similarity between dramatic and gameplay tension in "Bad Game Designer, No Twinkie! III" (Adams 2002a), and again in "Why We Shouldn't Make Games", in which I said, "It is this similarity between gameplay tension and dramatic tension that is the reason it's so natural to try put stories into games, and to make stories out of games." (Adams 2002b) In the next section I show the deeper difference beneath this apparent similarity.

12.2.2 Repetitive and Random Events

By 2005 I had come to realize that the analogy between dramatic tension and gameplay tension is faulty. In "Interactive Narratives Revisited", I argued that they are disanalogous because gameplay tension tolerates repetitive and random events, and dramatic tension does not. By repetitive events, I mean events—whether narrated, player-initiated, or computer-generated—that are identical or essentially similar to events that the player has experienced before.

> When you are playing a game, you are willing to tolerate a certain amount of repetition—often quite a lot, in a game like *Risk*—because you have a vested interest in each maneuver, even if it is identical to an earlier maneuver. In a story, however, no event should ever occur twice, unless there's some extremely good reason for it, and even then, it would be very unusual. (Adams 2005a)

Young children's literature is largely exempt from this generalization. Andreas Fischer observes in the introduction to *Repetition*, "Repetition and variation also characterise literature in various ways: repetition, for example, is characteristic of children's literature or poetry, while elegant variation was an ideal of prose style until the advent of modernism." (Fischer 1994, p. 10) He was referring primarily to the repetition of words rather than events, but when words describe an event, if the words are repeated exactly the reader will certainly assume that the event is repeated exactly too.

By random events, I mean events inserted into the experience by a random mechanical process without regard for their relevance to those events that precede or follow it. Games frequently use random events.

> If you're playing backgammon, you're about to lose, and you happen to throw double-sixes and thereby win the game, that's perfectly acceptable: it's the action of chance. However, if you wrote the same scene in a story, the reader would consider it a *deus ex machina*. It's not acceptable for the hero of a story to be saved by luck. (Adams 2005a)

While it is true that a few authors have created experimental works based on aleatoric principles, aleatory writing is not a reliable way to generate well-formed stories. A well-formed story, I argued, does not contain repetitive or random events.

> In a good story, nothing happens by chance and nothing is irrelevant. Even if something seems irrelevant to the reader, the author should have had a reason for including it. That is the nature of authorship. Stories are not created by die-rolling, but by design. Their novelty is constructed by the author to keep the reader interested and the story going forward. (Adams 2004b)

Game designer Jim Simmons agreed; in "If Aristotle Could Only See Us Now", he wrote,

> [Aristotle] states that a beginning is followed by a *natural* result, or middle, and an ending *naturally* follows something else, but nothing follows it. The key here to the quality of the dramatic experience is the natural quality of the events and event triggers. If events are arbitrary and untrue to the characters' natures or the audiences' sense of truth or probability, the drama will feel forced or flat. (Simmons 1996, p. 431)

Laurel briefly discussed how difficult it would be for an automated story-generation system to produce chance, yet believable, events:

> The accidental is closely related to the improbable. Although "there is a probability of things happening also against probability," [this quote is from Aristotle's *Poetics*] chance events may be either too fortuitous (a safe falls on the villain's head at just the right moment) or too bizarre (a gunfight is suddenly interrupted by a thunderstorm) to be believable. Producing chance events at all is difficult; producing believable ones requires extremely sophisticated knowledge and judgment. Such knowledge would be difficult to integrate into the causally driven functionality of the proposed system. In order to design a mechanism for producing chance events, research needs to be undertaken that will identify the kinds of conditions under which an accidental or "marvelous" event is most effectively employed in a dramatic plot. By studying various playwrights' use of such events, it should be possible to derive a set of heuristics for generating and employing them in the plots of interactive works. (Laurel 1986 pp. 245-246)

So far as I am aware, no such research has been undertaken.

One should not make the error of assuming that randomness, in the sense that I mean it here, precludes stories that include *seemingly* random events inserted as a means of shocking the audience or making a point about the fragility of life, as in, for example, Vonnegut's *Slaughter-House Five*. Such events are not genuinely random. Their author creates and inserts them into the narrative at a particular place for a specific purpose. They are not created by the the author literally throwing dice or tossing coins.

12.2.3 The Need for Dramatic Novelty

In summary, the apparent, but faulty, analogy between dramatic and gameplay tension encourages designers to think that merging gameplay and a story experience should be an easy and obvious thing to do. Consequently, many stories in games are inferior.

> These two characteristics of many games, repetition and randomness, make for poor stories. It's worth noting that the classic adventure game avoids both. It avoids repetition because its challenges are usually mental, not physical (you don't have to try things again and again), and because they are usually symbolic rather than numeric (you're trying to solve a series of unique puzzles, not to rack up points or money). It avoids randomness, again because its challenges are non-numeric, and random setbacks are tiresome and irrelevant in the context of storytelling. If the player receives a setback in an

> adventure game, it must be for a reason—a deliberately constructed reason, just like a setback in a story. This is why the classic adventure game comes closest to interactive narrative of any game genre we have yet invented. (Adams 2004b)

> The central point here is that stories require *dramatic novelty.* Things must change constantly, and they must never repeat. In games, there can be periods of stagnation, when nobody gains any ground, and there can be circumstances in which you end up in exactly the same situation that you were in once before. Games remain exciting in spite of these things because gameplay tension is not the same as dramatic tension. This, I think, is part of the reason that we've had so much trouble merging storytelling and gameplay: because they're not as similar as we think they are. (Adams 2005a)

12.3 The Credibility Budget

In "A New Vision for Interactive Stories" I established Ken Perlin's Law, which I discuss at greater length in section 9.5.2. Ken Perlin's Law states that "The cost of an event in an interactive story should be directly proportional to its improbability." Perlin proposed this cost, which he characterized as *energy,* as a price for making decisions that would tend to promote the generation of credible stories. I explore his idea further here; see Perlin 2005. In my lecture, I revised Perlin's formulation. I proposed that it should be called not *energy* but *credibility,* and that in fact the designer and the player metaphorically spend from the same credibility budget:

> The unit of cost of improbable events is their *credibility.* In fact every story, interactive or non-interactive, book, movie, television, or computer game, has a credibility budget... A story can only tolerate a limited amount of improbability before the credibility budget is exhausted, and the story is ruined. In the case of non-interactive narrative, the author controls and spends the credibility budget, and when the author blows it, she ruins her story. In the case of interactive stories, however, the designer and the player both spend on the credibility budget. If the designer blows it, then he's lost the player. But if the player blows it, then he's lost the designer. He's done something so improbable that the designer didn't budget for it... I think it's quite possible to build a quantity, a resource, into a game that is an amount of credibility, and to track it. In fact, I think a story-generation system, if we ever create such a thing, *must* keep a credibility budget. If it doesn't, it's going to generate nonsense. (Adams 2006a)

I went on to assert that this was not merely an abstract idea, but a practical suggestion; that an automated story-generation system would require some kind of credibility tracking mechanism as a heuristic for generating believable stories.

I did not mean to suggest that the credibility budget should be openly visible to the player, only that it would work to limit the computer-generated actions, and *possibly* the player's actions, to those that are credible. An analogous example can be found in *The Sims,* which offers the player, when he is controlling a specific character, a number of choices about how his temporary avatar should interact with another character. If the relationship among the two characters is not close, certain options will be unavailable, e.g. the player cannot make his avatar kiss another character when they have just met for the first time. The numbers that govern this feature are not available to the player; she only sees their effects.

Andrew Stern has criticized the idea as a means of constraining the player's behaviour because he privileges player freedom over coherence (see section 6.4.2). But in the same comment he also wrote, "To help maintain coherency and consistency, the NPCs [non-player characters] in the world can recognize that the player is now acting inconsistently, incoherently or crazily. They can resist the player, try to combat her actions." (Stern 2006) But to make such a judgement about the player's behaviour, the software must have a metric for doing so. How the player's incoherency score would be computed is open to debate, but such a quantity would have to exist.

This idea of the credibility budget was the proximate cause of my recognition that Assumption 2, that interactive stories shouldn't be games nor have internal economies (section 9.2), is unwarranted and creates problems for interactive storytellers.

12.4 Emotional Consequences Attending Different Types of Agency

In "Rethinking Challenges in Games and Stories" (Adams 2007), I contrasted two ways in which a player may exercise agency over the plot of an interactive story: via challenges and via choices. I discussed how the player's expectations and emotional responses differ in each case.

12.4.1 Changing the Plot Line Via Challenges

An interactive story can alter the player's plot line based on the player's ability to meet challenges. For example, *Wing Commander* (1990) challenged the player to

accomplish military missions. If the player failed, the story did not end (as is most common with such games); rather, the plot line took a different direction from the one it would have taken if the player had succeeded. About this, I observed,

> The emotional significance of this is that the player expects to be rewarded with positive dramatic consequences for meeting those challenges... if the game is about achievement, then the plot must reward achievement. (Adams 2007)

Admittedly this represents a slightly America-centric point of view, as Americans tend to prefer happy endings and to see competence rewarded; nihilistic or ironic endings after (apparently) successful heroic struggles are not popular. In *Infidel* (1983), a particularly notorious example, when the player successfully overcame all the game's challenges, the game ended with a narrative telling the player that his avatar had been killed. Many players were outraged at being given a disappointing ending after they had succeeded at the gameplay. I discussed happy and sad endings, and cultural expectations about stories, at greater length in my lecture "Eurostylin': An American Game Designer in Europe":

> I don't know that it's psychologically possible to create a good computer game with a purely sad ending. The outcome of a game is by definition success.[6] And success, particularly in light entertainment, is incompatible with pathos. This is another way in which *games* [in the formal sense] *are not stories*. Stories don't build up the reader's sense of pride and accomplishment, and therefore they don't create an expectation of reward. Games do.
>
> It might be possible to create some kind of an interactive experience which is *not a game* so that you can have a sad ending, but in that case I think it needs to abandon the traditional game elements of obstacles and achievements. [Emphasis original.] (Adams 2000a)

Most societies normally reward players for winning games and punish, or do not reward, players for losing them, and video games are no different. To give the player a downbeat dramatic event upon his overcoming a challenge feels emotionally incoherent.

6 Obviously the outcome of multiplayer games such as chess is not always success. I meant in this case single-player games of adventure in which failure leads to a premature ending, but the *final* ending, once the player reaches it, is by definition considered success.

I also showed that basing the player's agency on the ability to meet challenges harms replayability and could introduce an absurdity:

> If you base the plot branching on challenges, what happens if the player is really good? He zooms through the game and does really well, but if he wants to go back and see what other storylines there might have been, he has to play deliberately badly in order to see other branches. And that seems kind of weird. (Adams 2007)

12.4.2 Changing the Plot Line via Choices

If the player is allowed to exercise his agency through choices, the designer must be clear and honest about the significance of the player's options. The player uses common sense to determine what kinds of decisions are likely to have important consequences, and will be irritated if a seemingly trivial decision is shown to have large and unanticipated consequences.

> The emotional significance of [player agency via choices] is that dramatically significant actions, that is, those that do affect the plot, must be apparent, not obscure or trivial. (Adams 2007)

A well-known example of the foregoing appeared in the video game *The Hitchhiker's Guide to the Galaxy* (1984), adapted from the eponymous book: an important plot twist hinged upon whether the player had fed a sandwich to a dog. Players found it extremely frustrating, even though that kind of absurdity is what made the book so popular—which again highlights the difference between games and conventional stories.

I also argued that it is dishonest to lie to the player about agency and the importance of a decision:

> The player expects the progress of the plot to meaningfully reflect her choices. If you tell the player that her choices matter, then they damn well have to matter. Telling the player that it's vitally important that she make a choice, and then she discovers later that it didn't matter at all, is not acceptable. (Adams 2007)

Agency via choices promotes replayability. Players can play through the story again, try alternative choices, and experience a new plot line. Providing agency via choices enables designers to create sophisticated stories about moral dilemmas, or social or

political decisions, that providing agency via challenges does not. Finally, it allows players to make choices that reflect their own personal preferences or the way they choose to enact their role in the game, and to see the consequences of those choices reflected in their changing plot line. The *Dungeons & Dragons* game serves as a simple example: at the beginning of the game players make a choice to play their roles as evil, neutral, or good characters. The exact definition of these overly simplistic terms is up to the player, but it offers more moral freedom than most games do.

12.5 Challenges for the Semiotics of Video Games

In 2003 I gave a keynote address, "Transmitting Meaning in Interactive Contexts" (Adams 2003a), at the 3rd Conference on Computational Semiotics in Games and New Media at the University of Teesside. After a general introduction to the culture of the video game industry for the benefit of the academics there assembled, I observed several ways in which video games present challenges to conventional semiotic analysis. I warned the audience that my goal was to raise questions rather than to provide answers.

12.5.1 The Absence of an Invariant Text

No two players experience the game in the same way, and even one player does not experience a single-player game the same way twice. This is, of course, not news in the field of computational semiotics; I merely mentioned it as a starting point. I briefly considered, and rejected, the idea that the software's program code might serve as an invariant text; it was not clear to me what it would mean, in literature-theoretical terms, to have a text that the perceiver never actually saw.

At the same conference Michael Mateas presented a paper called "Expressive AI: A Semiotic Analysis of Machinic Affordances" (Mateas 2003b) in which he argued that computer program code expresses authorial intent through a sign-system of its own that stands in a particular relationship with a second rhetorical sign-system that is observed by the audience. I do not have room for further analysis here except to note that Mateas' viewpoint appears to contradict my own, and further study may be called for.

12.5.2 Symbol-Free Games

In my keynote, I suggested that it might be possible to find a game so devoid of symbols that it defied semiotic analysis:

> Can a game ever be symbol-free? Any type of striving for victory may be considered symbolically significant. We might argue that all zero-sum games are symbols. The very existence of a game makes the game a signifier. In that case, however, I would consider the game to be a meta-symbol.
>
> We therefore need to distinguish between the game and its content. I hold up a book: the book is a sign with numerous connotations. I open the book to reveal that it is empty: it contains no symbols at all. Therefore while the book may be a sign at a meta-level, it actually contains no signs. I believe it is possible for designers to create games that are symbol-free *to them,* i.e. they do not intend for the game to include any symbols. (Adams 2003a)

I considered and rejected tic-tac-toe (noughts and crosses) as symbolically meaningful because it is about the control of space, and the space itself is a symbol. I proposed Conway and Paterson's game Sprouts as a symbol-free game. In retrospect it occurs to me that although the game might seem entirely symbol-free to some players, a player familiar with the field of mathematical topology would immediately recognize mathematical concepts in it

12.5.3 Non-Symbolic Transfers of Meaning

Most video games do not explicitly tell their players the rules of the game, but leave the players to discover the rules through interaction. These games sometimes transfer meaning through secondary effects rather than through signs. *Missile Command* (1980) appears to be a straightforward single-player game about missile defence, but the enemy missiles keep coming faster and faster until the player eventually loses. There is no way to win. The game predated Ronald Reagan's Strategic Defense Initiative ("Star Wars") missile defence proposal by three years, but once Reagan had made the proposal, many players considered the game to be a satire on the SDI. *Catch the Sperm* (2001) uses a similar mechanism to send a different message; the game's object is to catch sperm and AIDS viruses swimming across the screen. The player can miss a few sperm and continue playing, but missing one single virus instantly costs him the game. In the keynote address I observed,

> But there is no sign! These details are only detectable through secondary effects. How do you perform a semiotic analysis when you can't actually point to the signifier?
>
> And then, just to make things even more complicated, there are games with emergent gameplay—ways of interacting with the game that the designers never anticipated. A good example is the rocket-jump in *Quake*, where you blast yourself into the air by means of your own rocket-launcher. This was not planned for by the designers.
>
> Again, the fixed media don't have this problem. You can show up at the cinema and watch the whole movie through green goggles, or sound-distorting headphones, but the director would say that that was an abuse, that watching it without green goggles was privileged. But in gameplay, there's a feeling that anything is fair. If the system permits it, it's allowed. How can you study symbol and meaning in a medium in which the person who is supposed to be the *de*coder can modify the content? (Adams 2003a)

Since my address, scholar Ian Bogost has devised the term *procedural rhetoric* to describe "the art of persuasion through rule-based representations and interactions rather than the spoken word, writing, images, or moving pictures." (Bogost 2007, p. ix) Bogost is chiefly concerned with persuasion rather than semiotics, but his schema represents a valuable contribution to the literature.

12.5.4 Summary

I concluded the address with the following remarks:

> It seems to me that there's a great deal of work to be done, and perhaps some very substantial revision of what we think "meaning" means. The interactive medium not only calls into question such things as what a text actually is, which I'm sure is old ground, but even what a symbol is.
>
> In a video game the subject becomes a part of the object; in a *multiplayer* game, each player contributes to the game, becomes a part of the game, both creator and consumer, encoder and decoder, simultaneously, while the so-called-designer retreats into the background, become more of an enabler. In effect, the author ceases to be an author and becomes simply a manufacturer of notebook paper.
>
> In games such as AmberMUSH[7], gameplay becomes a form of live improvisational theatre, with all distinctions between author and reader, text

7 MUSH stands for Multi-User Shared Hallucination. MUSHes are text-based multiplayer on-line games whose play consists almost entirely of improvisational role-playing. They lack the complex mechanics of conventional role-playing games. AmberMUSH was one such, set in fantasy writer Roger Zelazny's fictional Amber universe.

> and perceiver, figure and ground, broken down. The rules in a MUSH are nothing more than social conventions enforced by collective peer pressure. The game becomes about as susceptible to conventional literary analysis as the overheard conversations at a cocktail party. (Adams 2003a)

Works like Eliot's *The Waste Land* can have multiple layers of meaning and many, many references that some readers will recognize and some will not. Works can include messages that the author was not even aware of himself. But interactive media, with their emergent properties, and the seemingly infinite number of possible ways to experience them, challenge conventional notions of how semiotics should work.

13 Defining A Requirements Specification for Interactive Storytelling

I ended my lecture "Rethinking Challenges in Games and Stories" by proposing that a designer should begin by writing a requirements specification for the experience that she want to deliver:

> Do what works for your player and your product... *Write a requirements spec for what you want.* Ask yourself what you want interactive storytelling to do for you. Then choose an approach that meets your needs. Only you can answer the important questions about narrative immersion, depth of characterization, coherence, credibility, if and how the player influences the plot, multiple endings, and sequels and later exploitation opportunities. Only you can answer this for yourself. No argument on a message board can provide you with the answers to this. Let *your answers,* not other people's arguments, help you to determine what structure and mechanism you need. (Adams 2007a)

In the next few sections I demonstrate the value of requirements specifications for interactive storytelling and the reasons why they are needed in the video game industry. The following chapter presents a template and guide for creating one.

13.1 What Is a Requirements Specification?

In conventional engineering, a requirements specification is a document that states precisely what functionality a device or system should afford once it has been built. The specification can also include minimum and maximum performance limits and other design constraints. Requirements specifications frequently serve an important role in the contract between a company purchasing a product and the company that will design and build the product: the product must meet the specifications before the contract is considered fulfilled. The details of the specifications are usually the result of negotiations between the two companies, but ordinarily the purchaser will have the most say in the matter.

13.2 The Purpose of a Requirements Specification

I propose that interactive story designers should write a requirements specification not as the basis for a contract, but as a means for deciding and recording the designer's intent. Just as an engineer cannot begin to design a device without knowing what it is supposed to do, an interactive storyteller cannot begin to design

an interactive story without knowing how he wants the player to experience it. The document that I propose would be less rigorous than a traditional engineering specification, however. The requirements included in a specification for interactive storytelling would not be quantified values that must be achieved, but rather design goals to be sought. Only once the designer has defined his goals should he begin to make decisions about such details as the plot structure and the technologies that will implement the experience.

The greatest benefit of a requirements specification lies not in the document itself, but in the thinking and decision-making that go into the process of writing it. In *Fundamentals of Game Design, Second Edition,* I treat game design as a process of asking one's self questions (or debating them with colleagues) and writing down the answers, as thoroughly as is necessary for development to proceed efficiently. (Adams 2009) A designer creating a requirements specification for an interactive story would do the same. The act of writing formalizes and organizes the process.

A requirements specification should certainly cover the following issues:

- The means by which the player will be introduced to the story world
- Design goals for the player's sense of interactive freedom
- Design goals for the player's sense of agency over the plot
- The means by which the player may alter the plot line, if any, e.g. by making choices or overcoming challenges.
- Designer goals for the replayability of the game and the player's experience on second and subsequent replayings
- Whether the player will define her own avatar; if not, degree of avatar specificity desired
- Designer intentions for handling inconsistent behaviour by the player (which may include ignoring it)

- Designer intentions for handling player obstruction of the plot (which may include ignoring it)

I have addressed these questions in the template and guide that appears in Chapter 14.

13.3 Argument for the Need for Requirements Specifications

I believe that requirements specifications would be useful to the designers of interactive stories for four reasons:

- **Current design techniques are chaotic.** In the 1990s, during the heyday of the "interactive movie", a number of games were built that privileged the story at the expense of gameplay, with disastrous results. Gameplay was tacked on almost as an afterthought, and the games were commercial failures. (Adams 1995; Fisch 2009) But the reverse is far more common today; many games are designed with the story tacked on as an afterthought. (Crawford 2004, p. 69) Chris Bateman, a highly experienced designer of interactive stories, has written, "The only coherent story-creation processes I've encountered have been those that my own team brought into a game project. Most developers still treat story as a minor subsystem that will take care of itself through some magical unspecified process." (Bateman 2011) This matters little if the players care little about the story anyway; but it will not do if the designer wishes to offer a high-quality interactive storytelling experience in which player interactions blend seamlessly with a well-formed story.

  Even excellent books on crafting interactive stories, such as *Game Writing: Narrative Skills for Video Games* (Bateman 2007) fail to address the designer's goals or assumptions. Designers are encouraged to choose an approach without considering whether it really meets their needs. When this rush to design is combined with ignorance of the consequences of these decisions, problems can arise during development and testing that are sometimes catastrophically expensive to correct. The result is often an inferior experience for the player—if the product gets finished at all.

The work of writing a requirements specification would require a designer to state her goals and spell out her assumptions in advance, thereby establishing a target to aim for during the actual design and writing process.

- **Too many competing theories.** Many commentators, e.g. Crawford, Stern, and Glassner, have strong opinions about the right way to do interactive storytelling, and present arguments based upon unstated assumptions about what is desirable in an interactive storytelling experience. (Crawford 2004; Stern 2003a; Glassner 2004) Some of their viewpoints are mutually exclusive, leaving the ordinary practitioner bewildered. In "Rethinking Challenges in Games and Stories" I pointed out the enormous variety of conventional storytelling in the world—everything from jokes and television advertising to serious literature—and asserted:

  > No one theory of storytelling can cover all of these. Aristotle does not tell you how to write urban legends. Joseph Campbell does not tell you how to write for the *New Yorker.* So why would anybody think that one theory of interactive storytelling can possible cover all the forms of interactive stories? (Adams 2007a)

  Designer David Perry states it more baldly: "There is no one 'right' way to create a story [for a game]." (Perry 2009, p. 126) Clearly some means of choosing among the various approaches available is called for. The task of creating a requirements specification will encourage the designer to think about what he wants to accomplish, then make an informed choice from among his options for interactive storytelling.

- **Audience variety.** Different audiences like different kinds of presentational stories, and different players like different kinds of interactive stories. (Pratchett 2007) The element of interactivity adds a huge new dimension for the designer to take into consideration, because there are so many ways to interact.

  A game designer must identify her target audience as one of the very first things that she does—before prototyping or even seeking funding. This is not merely a question of identifying a potential market, but of choosing to serve

people who like a particular style of play. (Adams 2009, pp. 72–76; Schell 2008, pp. 97–112) This choice is no less critical for the designer of an interactive story. No story can possibly appeal to all players, so a designer needs to decide early which players she wants to appeal to, and how they like to interact with the stories in their games. The task of writing the requirements specification would include thinking carefully about player preferences and selecting a style of play to offer before beginning the work of designing the experience itself.

- **Pedagogy.** Game design students, and trainee designers and writers in the industry, need to become familiar with the implications of storytelling design decisions. As I have shown, the level of detail to which the avatar character is specified, for example, has important consequences for other decisions the designer must make about the player's interactive range. The various technical methods for structuring and advancing the plot described in section 3.3 each have strengths and weaknesses. These factors make a given approach more or less suitable for a certain type of plot, interaction, and player.

  I have addressed some of these issues, to the extent that space allows, in my own undergraduate textbook. (Adams 2009, pp. 155–184) However, I feel that the process of writing a requirements specification would be a particularly useful exercise for students, because it would require them to consider these issues and understand their significance for a story that they themselves were planning to create.

13.4 Objections

In this section I discuss three possible objections to creating requirements specifications for interactive storytelling, and show why they lack merit.

13.4.1 The Objection from History

The video game industry has managed for the last 40 years without writing requirements specifications for the storytelling experience, so one might ask why it should need to do so now.

The first and most obvious reply is that the history of the game industry does not reveal an unbroken record of success at interactive storytelling, so suggestions that there is no need to improve the process carry little weight.

I cannot formally prove that any particular interactive story would have been better had the designers written a requirements specification in advance. Such an argument would require, among other things, an objective means of measuring the quality of a story. Apart from that, there are too many other variables. Even a requirements specification cannot compensate for bad management, a dysfunctional team, or a rushed release (commonly cited as the reason for the poor story in *Star Wars: Knights of the Old Republic II* (2005) (Buecheler 2005)).

In general, however, there are sound practical reasons for designers to make written records of their plans before and during production. My article, "Why Design Documents Matter", describes these reasons in detail; I summarize them here:

- Funding agencies (publishers and others) want design documents as evidence that the designer knows what he's doing.
- Design documents are sometimes the basis for contractual obligations.
- Design documents communicate the designer's intentions to the rest of the development team, and let them plan their tasks.
- Design documents turn generalities into particulars.
- Design documents are a record of decisions made; they create a paper trail. (Adams 2007b)

A requirements specification can assist with all of these, particularly the third and fifth items. Many professional commentators emphasise the value of design documents (e.g. Schell 2008, pp. 381–388) and requirements specifications for interactive storytelling are another useful example, as I demonstrated in section 13.3. I regard that as a sufficient refutation of the objection from history.

13.4.2 The Objection from Creativity

At first blush the idea of a requirements specification may seem peculiar in a creative endeavour. Artistic people may reject the idea as too left-brained and too constraining of their creativity. They might claim that a requirements specification is a formal technical document whose development process is antithetical to the free flow of imagination required for devising a story.

However, commercial forms of storytelling entertainment have long used requirements specifications to establish guidelines for their writers. Here, for example, are the requirements of *The Absent Willow Review*, as specified in *2010 Writer's Market:*

> "Stories should fall between 2,000–8000 words in length. Stories above 8,000 words may be considered if deemed exceptional by our editorial staff and must not exceed 10,000 words." Needs fantasy, horror, science fiction. "We do not want to see erotica or excessive gore for the sake of gore. We will not publish stories that may be seen as promoting discrimination against other persons based on gender, age, sexual orientation, religion or race. Violence and profanity are not prohibited but should be used with discretion." (Writer's Digest Books, 2009)

This kind of information assists the writer in determining what the reader wants (or rather, what the editor thinks the reader wants). Similarly, the companies that produce television shows maintain show bibles, documents that set out in detail the constraints within which a screen writer must work to keep the show consistent from episode to episode. These, too, are effectively requirements specifications governing the content of the script of each new episode.

It is well-known in the game industry that it is far more complex and difficult to write stories for games than it is for presentational media, especially stories with non-linear plots. (DeMarle 2007, p. 72) Whether we like it or not as artists, creating a game story is necessarily a technical process, and technical processes demand a degree of formal planning.

13.4.3 The Objection From Process

Agile software development methods are starting to move away from formal requirements specifications and in the direction of less structured approaches.

(Leffingwell 2011) Game producers or project managers might object that requirements specifications are outdated and no longer needed as the game industry begins to adopt agile approaches.

I have two replies to this. My first reply is that the requirements specifications I am proposing that designers should write will not be as rigid as a classic engineering specification, for, say, a jet engine. They will be somewhat closer to the "user stories" used in agile development: statements of intent, which are fairly inexpensive to create. (Leffingwell 2011, p. 101) Designers need not fear that, in writing a requirements specification, they commit themselves to meeting fixed quantified values for which they are strictly accountable. The object of the exercise is to assist their thought processes and help them to understand their own goals.

My second reply to the objection from process is that the game industry cannot adopt all the features of agile software development, and must retain some aspects of more traditional approaches, particularly where story is concerned. There are two reasons for this:

- Most utilitarian software, whether it is a consumer productivity package or an embedded system for controlling an automobile engine, does not require the many gigabytes of highly expensive content that a large video game does. Agile software developers boast that they welcome late changes to product requirements. (Leffingwell 2011, p. 13) They can afford this luxury because for the most part all they have to change is program code. Drastic changes to a game's story, however, might require large amounts of expensive new animation or audio and video assets. Requirements specifications help developers to plan their budget and schedule and to keep the story development within stated limits.

- Agile development requires that, in the absence of formal specifications, the development team maintain a close relationship with the product's end users throughout the process. This is achievable with interaction-intensive, storyless games such as *Minecraft* or the many massively-multiplayer social games available on Facebook, which are continuously updated by their

designers after they are released to the public. It is not possible or desirable with story-intensive games such as AAA console titles. These games depend heavily on novelty for their market value. Revealing the story in advance to the player base would severely reduce that value.

In summary, the objection from process is not compelling because agile methods are not entirely applicable to commercial games, especially those offering stories, and requirements specifications still provide value to the development process at low cost.

13.5 Summary and Introduction to the Template and Guide

Designers in the video game industry need to better organize their thinking about interactive storytelling in order to take full advantage of their medium. Students and newcomers to interactive storytelling need guidance about the field. Current design options are poorly understood, and designers often begin work without clearly defining their audience or their goals. Worse yet, when designers turn to the literature for help they encounter a hodgepodge of conflicting advice, some of it rather bombastic.

As I have shown, the process of writing a requirements specification will help to alleviate some of these problems. Experienced designers already know how to write specifications, but for the inexperienced, some guidance is useful.

In March 2011 I introduced a preliminary template and guide to writing a requirements specification for interactive storytelling at the annual Game Developers' Conference. (Adams 2011a) An updated version of this document appears as Chapter 14. The guide consists of a general introduction to requirements specifications and definitions of key terms. The template offers, under appropriate headings, a series of questions for the designer to consider and debate with colleagues, as well as some possible answers. The headings organize the document, covering the subjects I mentioned in section 13.2 (and many more).

14 A Template and Guide to Writing Requirements Specifications for Interactive Storytelling

Ernest W. Adams

This document implements gender-neutral language by alternating (irregularly) between male and female pronouns.

Guide

This document offers a template for writing a requirements specification for an interactive story. It does not suggest a specific method for creating an interactive story, because no single method is suitable for all types of interactive entertainment experiences. Rather, it helps you to define your design goals for your interactive story, and suggests a number of important issues to consider before starting.

Important: This is **not** a template for designing the interactive story itself. It is a template for defining what *kind* of interactive story-like experience you want to offer.

Why Write a Requirements Specification?

> *"The only coherent story-creation processes I've encountered have been those that my own team brought into a game project. Most developers still treat story as a minor subsystem that will take care of itself through some magical unspecified process."*
>
> — *Chris Bateman, editor of* Game Writing: Narrative Skills for Videogames

Chris Bateman is exaggerating for humorous effect, but his point is right: too many game developers don't know enough about interactive storytelling, and too many of them dive into design without stopping to think about what they really want to achieve. To make it worse, there's a lot of loud debate in the game industry about the right way to do interactive storytelling that sheds more heat than light on the subject.

There is no one right way to do interactive storytelling. Each approach has its strengths and its weaknesses. But the first thing you must do is decide what you *want*

to do, and make informed choices about what kind of story you plan to offer. Ask yourself what you want an interactive story to do for you and for your player. Then select an approach that meets your needs.

The point of writing a requirements specification is to define your design goals for the player's experience of the story before you actually start to build the story. It is not meant to tie you down to a particular approach, or set a standard which you must meet. It doesn't have to read like engineering specifications for a jet engine. It's just a way of thinking through the options and recording your intentions.

If you don't understand why design documents are necessary at all, please see my article "Why Design Documents Matter," which is available at:

http://www.gamasutra.com/view/feature/1522/the_designers_notebook_why_.php

How to Use the Template

Each heading in the template represents a subject that you should address in a requirements specification. The text below the heading suggests issues to consider in deciding what to specify, and often includes a number of questions to ask yourself. Sometimes it offers lists of options to consider. These lists are not exhaustive; if you would like to see more options, please buy a good book on interactive storytelling. In many cases, these options are not mutually exclusive, but may be combined to create a hybrid approach to the issue.

Think the questions over and debate them with your design team, if you have one. Then write your answers or decisions under the heading.

Important: Read all the way through the template before making any decisions or beginning to fill it in!

Also important: It is not necessary, or even desirable, to work on this template in a linear fashion from the beginning to the end. Many questions in the template are interrelated, and your decisions about one issue will influence your decisions about another. *Think* through the issues first before you start to make firm decisions.

Definitions

In order to use this template efficiently, you must be familiar with the terms it uses.

- **Narrative.** Narrative consists of *that which is narrated*, i.e. non-interactive, presentational content. This can mean cinematics, voice-over narration, scrolling text, or any other story-presentation content that the player cannot change or add to. This is an intentionally naïve definition which avoids the mountain of debate about narrative in the academic literature. This means *interactive narrative* is an oxymoron. I prefer *interactive storytelling.*

- **Narrative immersion.** The player's feeling that he is deeply involved in a story, as distinct from being deeply involved in strategic or tactical gameplay.

- **Events.** When a player plays a video game, she experiences three types of events: those that are narrated to her (and cannot change); those that are the result of computation (and might be different on another playing); and the player's own actions, initiated through the user interface. These are **narrative events**, **computed events**, and **player events**, respectively.

- **Plot.** Plot consists of all the events in the story that are both dramatically significant (they either raiser or lower dramatic tension) and related, either by causality or subject matter to the majority of the other plot events. (Red herrings in detective fiction are not causally related to the other plot events, but related by subject matter—the reader thinks they are causal.)

  In interactive storytelling, the plot is the entire web of possible plot events that the player may experience in the course of play. This web may be predetermined by the designer, computed by an algorithm, or a hybrid. Different plot structures create different storytelling experiences, especially if the player plays the game more than once. The structure of the plot also determines the number of beginnings and endings that the story may have.

  Not all player events are plot events because not all player's actions raise or lower dramatic tension.

- **Linear plot.** A plot that the player can only take one path through, in which events that the player experiences in the future are not changed by anything the player does (or any computational process either).

- **Manifold plot.** A plot that the player can experience in different ways on different replayings. Manifold plots can be predetermined by the designer (branching and foldback/parallel/multilinear plots), procedurally generated by the computer, or a hybrid of both methods.

- **Plot line.** The course of events that the player *actually* experiences while traversing the plot.

- **Interactive range** or **freedom.** The total variety of actions available to the player, as provided by the user interface. Note that a large interactive range does not necessarily imply that the player can influence the plot of the story. A player might be able to do a million things in a game universe and still be unable to affect future events in the story.

- **Agency.** In general, this means the capacity to effect change; in this document, it means the player's ability to influence or change future events in the plot, or to modify the plot line in a predetermined plot.

- **Interactive storytelling.** A systematic process that makes a player feel as if she is *immersed in* and *contributing to* a story. A story that the player interacts with by contributing actions to it. This applies *even if those actions do not affect the plot line.* Linear plots are still interactive because the player still interacts with them by contributing actions to them, possibly by causing the plot to advance, and by experiencing events as they unfold.

- **Well-formed story.** This term refers to the audience's general feeling that a story is making sense and not absurd or boring. A well-formed story possesses some or all of the following important qualities:

- The author's, or designer's, contribution to the story is coherent. If the designer (or the computer program) creates nonsense or absurdities, the story is not well-formed.

- The experience preserves credibility within its own inner laws. Even science fiction and fantasy stories have some limits on their credibility.

- Plot events occur at a rate sufficient to sustain dramatic tension.

- The story contains few or no random, arbitrary, or repetitive events. (Arbitrariness violates the need for a sense of causality in a plot. Repetition destroys dramatic tension.)

An ***interactive* well-formed story** exhibits additional properties:

- The player derives entertainment through contributing to the plot. In most interactive stories the player enacts a character in the story, normally the protagonist.

- Dialogue and character interactions usually play a significant role.

Note that an interactive storyteller is not required to provide all of these qualities. Players' demands and expectations about their interactive stories vary considerably, and it is up to you as a designer to choose which of these you want to implement. However, the more of them that you abandon, the more you risk the player feeling that your story is not well-formed.

Ideally, in a well-formed interactive story, the player's actions are coherent with the plot, the story's world, and the definition of the character she is enacting. If the player has a lot of freedom, she might be able to destroy the well-formedness of an interactive story. Whether you choose to allow this is up to you.

- **Procedural rhetoric.** A term devised by Ian Bogost for a message that is communicated to the player through algorithmic processes rather than explicit narration.

How Your Design Decisions Affect Your Story Design Goals

The diagram on the following page illustrates the various design decisions described in the template, and how these decisions influence one another and your overall goals for the experience. This section describes and explains the diagram, with reference to the sections of the template where you can find more details.

Boxes

Boxes represent the major and minor design decisions and tasks that you will undertake, perceptions that you may hope to create in the player, and activities that the player may perform. They are colour-coded as follows:

- **Light blue boxes** represent player perceptions that you may seek to achieve as a design goal of the experience. Some of these are affected by the player's own activity

- **Gold boxes** represent major design decisions and design tasks that you will have to complete to design your story.

- **Green boxes** represent smaller, supporting design decisions that either influence, or form a part of, other elements in the diagram.

- **Red boxes** represent player contributions which may affect her experience of the interactive story. As the designer, you must decide what options will be available to the player.

Four boxes near the centre of the diagram have heavy outlines. These are the most important design goals and should be established first. They are discussed in section 14.2 of the template.

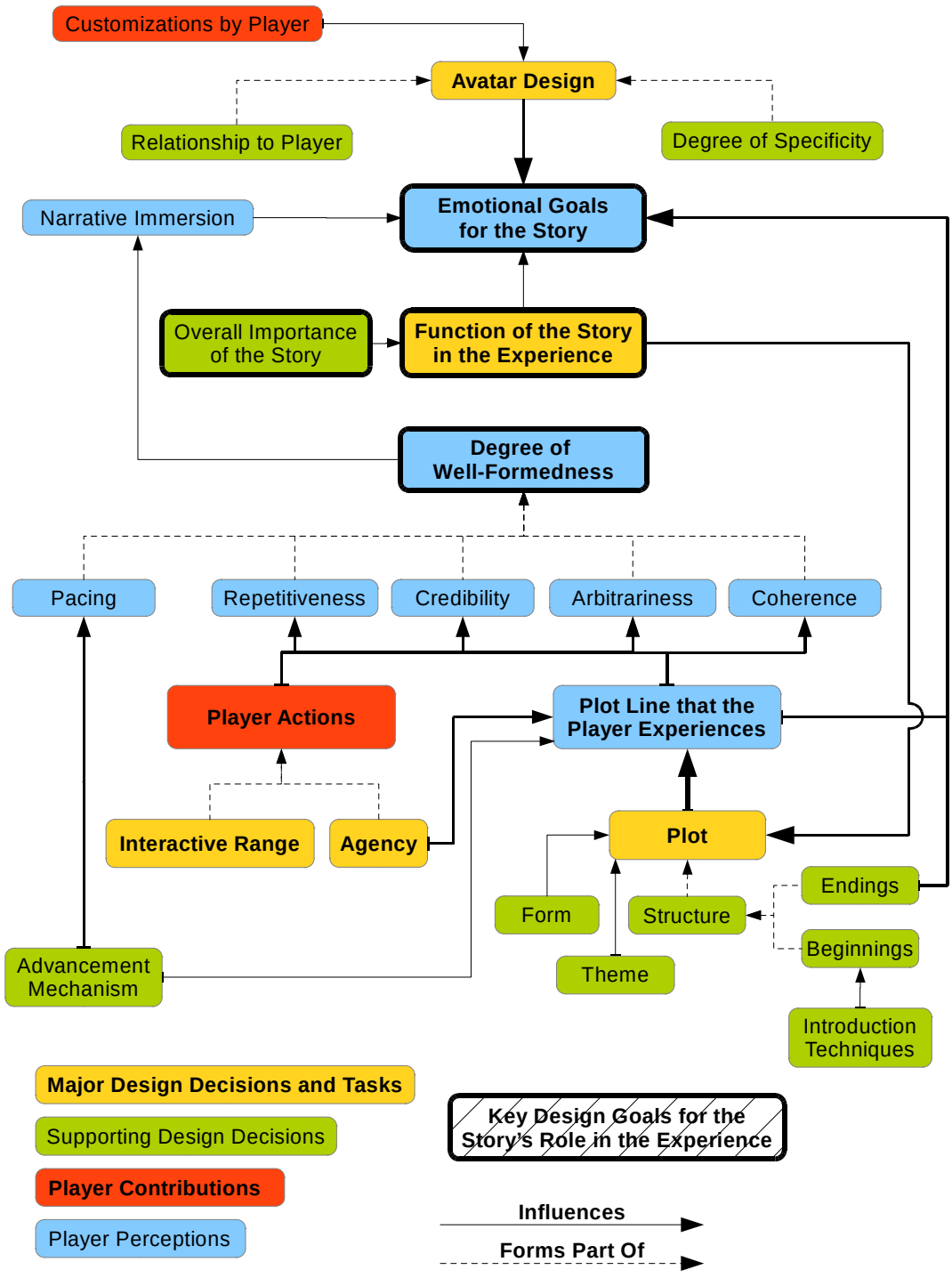

Figure 1: Relationships Among Design Decisions and Goals

Arrows

Arrows connect the boxes to show a relationship between them. There are two types of arrows:

- **Solid arrows** from one box to another indicate that decision, task, or activity in the first box influences the second one. The thickness of a solid arrow is intended to roughly represent the degree of influence exerted by the decisions in the first box on the second one. For example, the overall design of the plot has a strong influence on the plot line that the player experiences.

- **Dashed arrows** indicate that the first box actually forms a part of the second. At the lower right, for example, the endings and beginnings of the story form a part of the plot's structure, and the structure forms a part of the plot itself. Dashed arrows are all the same thickness.

Key Design Goals

Just above the centre of the diagram are four boxes with heavy outlines that represent the most important design goals that you must define for yourself at the beginning of the process. They are:

- **Overall Importance of the Story** (as a part of the interactive experience). This is not normally a difficult decision, but it determines the attitude you will take to every other decision you make. It is discussed in section 14.2.1 of the template. It has an immediate influence on the next key decision, Function of the Story in the Experience.

- **Function of the Story in the Experience.** Discussed in section 14.2.2, this influences the plot itself and your goals for the player's emotional perceptions, shown in the box Emotional Goals for the Story.

- **Degree of Well-Formedness.** Is it important to you that the player perceives your story as well-formed? How well-formed the story is will affect his narrative immersion, which in turn will effect his emotional response to the story. As described in section 14.2.3, the player's perception of well-

formedness comprises several factors: pacing, repetitiveness, credibility, arbitrariness (or randomness), and coherence.

- **Emotional Goals for the Story.** This represents your plans, or intentions, for the player's emotional perception of the story. It is influenced by four factors: The design of the avatar, the player's degree of narrative immersion, the overall function of the story, and especially the ending or endings. I discuss this aspect in section 14.2.4.

You should make these decisions about the story first, and bear them in mind when you make later design decisions. If a later design decision conflicts with one of these key goals for the story, your risk undermining your basic intentions for the story, and you should re-evaluate the decision. It is generally unwise (and expensive) to change a key goal later in the process.

Other Design Tasks

When you have established the four keys goals for your interactive story, you can begin the work of designing other aspects of the experience, which include the other decisions and design tasks in the diagram.

- **Avatar Design** (section 14.8 of the template). Along with all the various other aspects of the avatar (appearance, animations, and so on), two important decisions form a part of the avatar design for storytelling purposes: the *degree to which the avatar will be specified* (discussed in section 14.8.1), and the *avatar's relationship to the player* (discussed in section 14.8.2).

  In addition, you may offer the player the opportunity to customize the avatar in various ways; these options also influence the avatar's design.

- **Player Actions.** All the player's actions have a powerful influence on her perception of the game's well-formedness, because the player can act in ways that affect the story's repetitiveness, credibility, arbitrariness, and coherence. If you want the player to perceive the story as well-formed, you have to keep this in mind as you define what actions are available to the player. Two key

design decisions form part of defining the available actions: the degree of *interactive range* the player will have (see section 14.4), and the degree of *agency* she will have over the plot line (section 14.5). Player agency determines what plot line the player will experience in a given play-through.

- **Plot** (section 14.6 of the template). At this point you should not be trying to define what the plot of your story *is*, but the *kind* of plot that you want. Your earlier decision about what function the story will have in the player's overall experience will influence your choices about the plot. The *form of the story* (section 14.3) describes its nature on a large scale, typically by analogy with other media—a three-act play versus an unlimited series, for example—which influences the plot. Choosing a *structure* (section 14.6.1) for your plot determines whether the plot will be linear or manifold and predefined or computed (or a hybrid). Other aspects of the structure include the number of *beginnings* and *endings* that the plot will have (sections 14.6.2 and 14.6.3). The ending or endings will have a strong effect on the player's emotional perceptions. You will also have to find a way to *introduce* the player to the game world, and your choice of means will influence the way that the plot begins (section 14.6.2.1). Finally, if you want your story to have a *theme* (section 14.2.1.2), it may influence the plot.

- **Plot Advancement Mechanism** (section 14.7 of the template). Your choice of mechanism (time, avatar movement, completion of tasks, etc.) will influence the plot line that the player perceives, and strongly influence his perception of the story's pacing.

Template

14.1 Introduction

The Introduction section of your specification document should consist of a highly condensed high-concept statement for the game itself, as well as fundamentals such as platform, genre, aesthetic or literary style, and target audience. If you're creating a serious game, you should also state what the game is trying to accomplish apart from entertainment.

14.2 Goals for the Story's Role in the Entertainment Experience

In this section, document your most fundamental reasons for including a story in your interactive entertainment experience. Why do you want a story? What do you expect it to do for the player? What do you want it to accomplish? *You should make these decisions before any others about the story.*

14.2.1 Overall Importance of the Story to the Experience

On a scale from minimal to critical, how important is the story as part of the player's experience?

Background: A video game offers many sources of entertainment, including overcoming challenges, exploring, creation or construction, social interaction, appreciating the aesthetics of the game, progression/growth, learning new skills, and of course the story. If you were to analyse the player's entertainment experience in terms of these entertainment sources, what percentage of the player's entertainment would come from the story?

14.2.1.1 Narrative Immersion

How important is it to maintain the player's sense of narrative immersion in the game? Does it matter if parts of the game do not feel story-like? State your expectations here.

14.2.1.2 Theme

Do you want your story to have a theme or underlying message? What means do you expect to use to convey it to the player? Some options include direct narration, experience of plot events, and procedural rhetoric.

Background: *Theme* refers to the general idea, message, or moral of a story. It can normally be summed up in a declarative sentence. For example, the theme of Kurt Vonnegut's *Slaughterhouse-Five* might be, "The world is absurd and horrible." The Harry Potter books have many themes about the value of friendship, integrity, and courage.

14.2.2 Function of the Story

What is the function of the story in the context of your game? A non-exhaustive list of options includes:

- Framing narrative only, no storytelling during gameplay
- Linking episodes of gameplay (level transitions)
- Providing background or context during play
- Story events interwoven with gameplay, but the story events are not caused or changed by gameplay events (loose integration).
- Story events interwoven with gameplay, and the story events *are* caused or changed by gameplay events (tight integration).
- Central—the game *is* the story, and other considerations are subordinated

14.2.3 Well-Formedness

How important is the well-formedness of the story experience to you (and to your player)? Are some aspects of well-formedness more important than others? Well-formedness will have an effect on the player's sense of narrative immersion. State which you especially want to preserve:

- Credibility
- Coherence or consistency
- Player coherently enacting a character (role-playing)
- Player contributing to the plot (actions are part of the story, not ancillary)
- Few random, arbitrary events
- Few repetitious events
- Sufficient pace to maintain dramatic tension

14.2.3.1 Credibility

Do you care whether the story is believable? (If it is a comedy, you may not.) Does it matter to you if the player does things that are simply not credible? If so, how will you prevent it? (Given that games often limit the player's ability to perform non-credible actions.)

If you plan to use a procedurally-generated plot and you want the story to be credible, how will you guarantee that it always generates credible plot lines, and always generates credible responses to player inputs?

14.2.3.2 Coherence

How much does it matter to you that the plot maintain coherence? Coherence is usually guaranteed by placing limits on player freedom. Ask yourself the following questions:

- Can the player violate the game world, by introducing elements that do not belong there (e.g. a gun into a car race). As regards physical objects, this is easily prevented by not including such objects in the game. With respect to speech, however, do you care if the player can speak of concepts not included in the game world, and if so, how do you propose to prevent it?
- Can the player violate his avatar's character, that is, behave out of character? If the avatar is unspecified or player-specified this is not an issue. If you do not want the player to behave out of character, how will you prevent it? (Avatars in point-and-click adventures usually refuse to perform out-of-character actions even if those actions are available in the user interface.)
- Can the player violate the plot, i.e. perform actions that produce plot absurdities, such as killing a character who later reappears in the game? If not, how will you prevent it? Some options include limiting the player's freedom to perform such actions, use of manifold plotting, or preventing the player from finding or from interacting with plot-critical characters or objects.

14.2.4 Emotional Goals for the Story

Will the story contribute significantly to the player's emotional experience of the game? What will the overall emotional tone of the story/game be? What emotions do you want the story to elicit? A non-exhaustive list of options includes:

- Suspense
- Pleasant surprise
- Unpleasant surprise
- Pathos
- Caring/nurturing
- A sense of constructive achievement
- A sense of destructive achievement
- Triumph/exultation/fiero
- Comedy

See David Perry and Rusel DeMaria's book *David Perry on Game Design* for a much more extensive list.

14.3 Form of the Story

What overall form do you want the story to take? A non-exhaustive list of options includes:

- Classic Aristotelian 3-act structure (play/movie length)
- One-act structure (short story)
- Multi-chapter story (book length)
- Trilogy or other closed-ended series
- Multiple independent stories in common universe, no overarching story arc (for example, *Star Trek: The Original Series*)
- Multiple interrelated stories in common universe, one overarching story arc (for example, *Babylon-5*)
- Soap opera (endless continuing story in common universe, with multiple overlapping plot lines)

14.4 Player Freedom (Interactive Range)

Define in general terms (do not specify the entire user interface or action set) how the player can affect the game world. Define the mechanisms of manipulation, including ways the player can interact with NPCs. These might include physical, economic, social, or creative activities.

Define the mechanisms by which the player can express their avatar's character or personality. Some options include a player-defined/customized avatar; conversation; mood icons; moral choices.

Do any available player actions tend to make the story feel less well-formed and coherent? How can you ameliorate the effect of this on the player's perception of the story?

Background: Choosing the actions that we give the player to perform is one of the most profoundly important design decisions in interactive storytelling, because those actions become part of the story. At this point in the design process it's too early to define the action set precisely, but you should think about what broad categories of things you want the player to do, and how actions of those types contribute to the player's sense of immersion in a story.

You also need to think about how you will enable the player to role-play their avatar in such a way as to enhance the story. Remember that stories are not only plot. Some material exists to illustrate character, and giving the player choices in how his avatar acts lets the player convey the character of the avatar.

14.5 Agency

Do you want the player to have agency? How much? (High levels of agency will require procedurally generated plot structures, which are more complicated to implement and *much* more complicated to debug.) Your answers to the following questions will have implications for the game's replayability.

What general categories of actions do you plan to allow to change the player's plot line? The answer to this will depend considerably on your game's genre and setting.

Do you want the plot line to vary based on the player's ability to meet challenges, so the story changes if she does well or badly?

Do you want the plot line to vary based on the player's choices?

When do the effects of the player's activities on the plot line become noticeable? Immediately? Or are they deferred? Or are the effects of the player's actions cumulative, so no one action changes the plot line, but they build up over time?

Background: *Agency* refers to the player's ability to influence his plot line through the story by making choices or taking actions.

14.6 Plot

Be sure that you understand the definition of *plot* and *plot line* provided in the Guide above.

14.6.1 Plot Structure

What structure do you want for your plot? This is a profoundly important question that will influence many other decisions you must make. The structure of your plot is closely related to the question of agency. If you want your player to feel a sense of agency, you must provide a manifold plot structure. There are many ways to organize a plot and the underlying technology is substantially different. A non-exhaustive list of options includes:

- **Linear plot.** This is the classic storytelling form. The player can contribute actions to the plot, but cannot alter the content of the plot or future events (the player has no agency). Often the player's actions serve to advance the plot; it stalls or ends prematurely if he fails at a challenge. If your story is linear, the plot line and the plot are one.
- **Manifold plot (predetermined).** Branching and foldback (multilinear) plots are predetermined manifold plots, typically implemented as directed acyclic graphs. If you choose this approach you will have to define the structure of the graph and decide what causes the player's plot line to branch at various points in the graph. The player's agency consists of making choices that cause the plot line to take one direction or another.

- **Manifold plot (computed).** A computed plot is not predetermined by the designer, but arises out of the internal mechanics of the game. As the designer you must create a story-generation system that produces well-formed stories algorithmically. This will require heuristics or other mechanisms that prevent the system from generating absurdities. These systems offer the player maximum agency, but it is difficult to ensure that they generate a coherent, well-paced experience.
- **Hybrids.** It is not necessary to confine yourself to one of these structures. It is possible to build an interactive storytelling system that combines them.

14.6.2 Beginnings (Initial Conditions)

The beginning of the story sets the scene, establishes the character of the protagonist and others, and establishes dramatic tension for the first time.

14.6.2.1 Means of Introducing the Player to the World and Characters

How will you introduce the world and characters to the player? A non-exhaustive list of options includes:

- **Introductory narration.** Non-interactive material that sets the scene, sometimes in the form of cinematics, voice-over narration, or scrolling text.
- **Introductory clues.** Introductory material is built into the environment, such as a journal, newspaper, etc., so that the player's initial explorations reveal the basics of the game world.
- **Mentor character.** The player begins the game without much introduction, but soon meets a mentor character who explains the world to him.
- **Tutorial level.** The player must play through an explicit tutorial which introduces her to the world.
- **Amnesia device/Sink or swim approach.** A tired but workable device, the player plays a character who is said to have amnesia and so gets no introduction at all. The player's unfamiliarity with the world is the avatar's unfamiliarity too. You need not use actual amnesia; in broader terms, any time the world is as new to the avatar character as it is to the player—the avatar is a new recruit in an organization, is kidnapped into a different world, falls down a rabbit hole into Wonderland like Alice—as long as the first

encounters in the game world can't kill the avatar, the player can learn by doing.

Background: In approaching the game for the first time, the player knows very little about the interactive story's world and characters, just as a reader doesn't know about a book before opening the cover, or a movie-goer doesn't know what's in a film until the titles roll. But unlike readers and movie-goers, who are passive, the player must begin to act in the fictional world.

14.6.2.2 Number of Beginnings

Do you want your story to have multiple possible beginnings? If so, how will the software choose among them? By random chance, some other computed method, or can the player make some decision that influences how the story begins for him?

Relatively few games bother with multiple beginnings because they do not have much emotional significance; the player is not yet invested in the story. However, there are various options:

- **Single beginning.** (Traditional)
- **Dual beginnings.** Can be characterized as "Choose a side to play" in games about conflict.
- **Plural beginnings.** Player may choose from among a number of characters to play, or choose a starting point on a map, for example.
- **Indefinite number of beginnings.** Seen when players start with a randomized universe and situation within it.

14.6.3 Endings

How many possible endings do you want your story to have? Note: any time you have more than one ending, because of the game context (the idea of winning and losing) and the history of computer games, players are likely to feel that one of them is the "right" or "best" ending.

Some options:

- **Single ending.** The classic storytelling approach; packs the most emotional punch.
- **Dual endings.** Can be characterized as winning or losing, or as the result of player decision-making during play.
- **Plural endings.** Can reflect a more complex story in which the player makes several meaningful choices in the course of play, where *meaningful* indicates a choice that will direct the plot line to a different ending, or makes one choice with multiple options, which determines which of one of multiple endings the game will supply.
- **Indefinite number of endings.** These endings must be computed from the game's mechanics. For example, the rank to which the player's avatar is promoted at the end of a game might be determined by a numeric score of some kind. Packs the least emotional power as one ending is very like another.

14.7 Plot Advancement Mechanisms

The player experiences the story in linear real time. You must define the rate at which the player experiences events in the plot line, and the triggers that cause the player to experience these events. In this section, define how you want the plot to advance.

Is it important that the plot advance in a smooth, uninterrupted fashion, or is it acceptable for it to stall temporarily or indefinitely? What will cause the player to experience new plot events? Below are some options for advancing the plot, each of which has consequences and tradeoffs.

- **The passage of real time controls advancement.** In this case the plot advances continuously in real time and the player must keep up. This creates a powerful sense of urgency in the player. In a less aggressive form, the plot advances when internal timers expire.
- **Avatar movement controls advancement** (the story as a journey). The player's control over avatar movement determines the pace of advancement; if the avatar stops moving, the plot stops advancing.

- **Overcoming challenges controls advancement.** The plot advances when the player achieves things in the game, and remains stalled so long as the player fails to achieve.
- **Player choices and other interactions control advancement.** Generally seen in social simulations or dramas, the player's interactions with the other characters (often conversations) control advancement. If the player does not interact, the plot stalls.

Note that these may all be combined; it is not necessary to use only one, but to understand what each offers. Think about the kind of game and story you want to create and decide which of these will be most appropriate.

14.8 Avatar Considerations

You should not design the avatar character here, but should think about how you want the player to perceive the avatar, as this will have an impact on her emotional experience of the story.

14.8.1 Degree of Avatar Specificity

To what degree do you want to specify the avatar? Avatar specifications include such things as appearance, temperament, vocabulary, intelligence, attitudes about the world, and background, as well as an animation move set that is determined by the variety of activities he may undertake and events that may befall him.

Avatar specificity runs along a continuum:

- **Unspecified avatar** (Gordon Freeman from the *Half-Life* games). The avatar is never seen and never speaks. The player *is* the avatar.
- **Partially specified avatar** (Lara Croft from the *Tomb Raider* games). You will specify the avatar to a limited extent. Lara Croft has an appearance, but little emotional life or personality.
- **Richly-specified avatar** (April Ryan from *The Longest Journey*). Mostly found in adventure games, richly-specified avatars are fully-fleshed-out characters with appearances, personalities, vocabularies, and so forth of their own.

- **Player-specified avatar.** The player may build her own avatar to whatever extent you choose to offer; it usually consists of choices about appearance and game statistics. This approach will require you to include a character creation feature in the game.

Note that if the player's avatar is unspecified or player-specified, the player can never do anything in the game that seems to be "out of character"—the character is his to define.

14.8.2 Desired Relationship to the Player

How do you want the player to feel about and to treat the avatar? A non-exhaustive list of options includes:

- **The avatar is a role to be enacted.** The player inhabits the character and brings it to life. The avatar says what the player says.
- **The avatar is a tool for influencing the game world and/or plot.** The player has little emotional connection to the avatar as a person; it is merely an appendage of the player in the game world. The user interface affords few opportunities to role-play the avatar as a character.
- **The avatar is a character separate from, but guided and influenced by the player.** The player's control over the avatar may be indirect rather than direct. The avatar may speak *to* the player as if the player were another person present, or as if the avatar were talking to herself. This approach is commonly found in point-and-click adventure games.

14.9 Concluding Notes

If you have any special notes about your storytelling goals, write them in here. This is especially important if you plan to do something unusual, such as to tell a very surreal story, or to allow the player to enact more than one character in the story.

15 Conclusions and Future Work

This thesis has examined a number of conceptual and practical problems associated with the design and production of interactive storytelling experiences. In this chapter I summarize my contributions and suggest a possible direction for future work.

15.1 Review

The quality of the interactive stories that the video game industry offers to its players has not yet begun to approach that of the presentational media. It was with this in mind that I began to investigate some of the problems of interactive storytelling in 1995. In the course of my career I have examined a number of topics in the field, some more and some less closely related to one another. I have addressed the most important and difficult problems first, and collected in chapter 12 several other contributions.

The first three chapters of the thesis introduce the subject and my contributions to it, set out the boundaries of the work, and define key terms. As few standards exist in the literature for the meanings of many commonly-used words such as *plot* and *narrative*, chapter 3 is devoted entirely to explaining my usage.

Chapter 4 introduced the three problems for interactive storytellers that I addressed in “The Challenge of the Interactive Movie” (Adams 1995). These were the Problem of Amnesia, the Problem of Internal Consistency, and the Problem of Narrative Flow. As of that date I asserted that these problems could not be solved but only endured; they were intrinsic to interactive media. In the same lecture I identified a tension between the player’s desire for freedom and the designer’s desire to provide a well-formed story.

Chapter 5 considered the Problem of Amnesia and showed that the problem arises from the tripartite nature of the player’s status in an avatar-based interactive story, as actor, audience, and player. When the player enacts an avatar who is supposed to already know a great deal about the virtual world, and the player does not in fact know the things the avatar is supposed to know, the player is at a loss. I determined that in the early stages of an interactive story the storyteller must introduce the player to the world, just as she must in presentational media. The player normally expects to

play an active role even in the early stages of the experience, so the designer must carefully craft an introduction that permits interaction at the same time. I concluded that the problem is essentially one of craftsmanship and not a fundamental incompatibility between interactivity and story-like experiences.

In the literature, the Problem of Internal Consistency is the most widely discussed of the three problems for interactive storytellers that I described in “The Challenge of the Interactive Movie”. (Adams 1995) In chapter 6 I showed that it is possible for players with enough interactive range to act inconsistently with the way their avatar’s character was specified; to act inconsistently with the story’s world; and to act in such a way as to create absurdities in a predefined plot. I then considered the recommendations that I and a number of other commentators had made over the years, most of which amounted either to privileging the player’s desire for freedom or privileging the designer’s wish to provide a well-formed story. In Adams 1995 I had proposed creating sandbox games to resolve the problem, but I showed in section 6.4.3 that sandbox games have trouble producing well-formed story-like experiences. In “Why We Shouldn’t Make Games” (Adams 2002b) I recommended a compromise solution in which the designer gives the player only limited interactive freedom, and the designer specifies the player’s avatar in such a way that these limits seem justified. While this solution does work, to constrain all interactive stories to such a compromise would be undesirable.

Chapter 7 describes the Problem of Narrative Flow and various efforts that the video game industry traditionally uses to resolve it. In Adams 1995 I observed that players with enough interactive range might be able to obstruct the smooth flow of the plot and might be able to avoid the precursor events necessary to make the dramatic climax coherent. I considered and rejected three traditional game industry solutions to these problems. In chapter 7 I briefly examined the contributions of others, then reconsidered my own rejections of the solutions I had originally examined. Some of my original rejections proved to be unjustified; if the solutions were used in combinations they might work for some cases.

My reanalysis did not fully resolve the Problems of Internal Consistency and Narrative Flow, however. It showed that the problems can be resolved in certain

kinds of interactive stories, but in those stories that offer the player great interactive freedom the problems remain an obstacle to presenting well-formed stories. Chapter 8 briefly discussed the tension between player freedom and well-formed stories as the underlying source of both problems.

Chapter 9 laid the groundwork for my resolution of the Problems of Internal Consistency and Narrative Flow. In "A New Vision for Interactive Stories" (Adams 2006a) I proposed that some of the difficulties that the game industry has suffered in trying to resolve the problems were caused by three faulty and often unstated assumptions about what an ideal interactive story would be like. These assumptions stated that player freedom and agency should be maximized; that interactive stories should not be games and should hide their internal economies; and that the player should not have to think about any rules or to voluntarily constrain his own behaviour. In section 9.4 I added a corollary assumption, that the designer is entirely responsible for the quality of the player's experience and the well-formedness of the story. The remainder of chapter 9 argued that these assumptions were utopian, unrealistic, and an active obstruction to progress in solving the problems of interactive storytelling.

In Adams 2006a I introduced a schema for thinking about interactive storytelling and about the designer's and player's relationship as collaborators. Chapter 10 discussed the new schema in detail, addressed possible objections, and considered the work of some other commentators. According to the schema, the designer and player share joint responsibility for the quality of the player's experience, with the player's responsibility directly proportional to the interactive range that the designer provides to him. The designer/player relationship is seen to be collaborative and contractual. The schema abandons all the faulty assumptions described in chapter 9.

Chapter 11 demonstrated how the collaborative schema resolves the Problems of Internal Consistency and Narrative Flow. As the problems arise from on the faulty assumption that the designer holds exclusive responsibility for the player's experience, transferring a portion of the responsibility to the player resolves them. The discussion covered all possible combinations of accidental and intentional player actions, and of predefined and procedurally-generated plots.

Chapter 12 explored a variety of related contributions that I have made to the literature of interactive storytelling. I include this material to demonstrate the range of my thinking on the subject in the 16 years during which my research took place.

Chapter 13 introduced, and made and case for the value of creating, a requirements specification for interactive storytelling. A requirements specification for interactive storytelling is a new type of design document that assists the development process. Such a document would assist designers to understand their goals for an interactive story and the possible consequences for choosing one approach over another. It would also serve to record the designer's intentions about the player experience they wish to create.

Chapter 14 contains an updated version of the template and guide for creating a requirements specification that I introduced in chapter 13.

15.2 Conclusion and Practical Impact

Much of the difficulty surrounding the debate on interactive storytelling arises from vague, conflicting terminology and from the introduction of ideas from literary and other forms of criticism that apply poorly, if at all, to all the various forms of interactive storytelling. In this thesis I have provided definitions that I believe are clear, unambiguous, and workable.

Many of the industry's problems in creating high-quality interactive stories can be blamed upon unexamined assumptions, and from designers' failure to clearly define their goals. It has been my object to bring clarity and practical advice to the subject. By abandoning the worst of the assumptions, and by adopting a new perspective on the relationship of the player and the designer and on their respective obligations regarding the well-formedness of the story experience, I believe that designers will find the task of interactive storytelling easier to understand and to perform.

This thesis provides conceptual, rather than technical, resolutions to these problems; but that is because I believe many of the problems have arisen from faulty conceptual, rather than technical, understanding. There still remains much worthwhile experimental research to do. Such challenges as providing great player freedom while still offering a well-formed story, or preventing players from

unintentionally causing incoherence in the story, will continue to benefit from efforts to create software systems that evade or resolve them. The work on procedurally-generated forms of interactive storytelling such as interactive drama, and hybrid forms such as *King of Dragon Pass,* represent useful first steps. So far most of these efforts have been confined to narrow experimental domains, but in the future I hope to see more generalized solutions. Nevertheless I do not expect procedural story generation to fully replace traditional methods, any more than 3D-rendered game worlds have fully replaced 2D ones. They are all tools in the designer's toolbox.

Most of the industry (not academic) arguments about interactive storytelling have concentrated on data structures and delivery technologies—the relative merits of branching and foldback stories, and so on. As of 2007 I had come to the conclusion that most of these disputes were unprofitable. As I pointed out in "Rethinking Challenges in Games and Stories", it is an error to spend too much time debating structure and organizational mechanisms:

> This is like taking a class in creative writing and spending the whole time studying grammar. What matters is the player's experience, not the mechanism that delivers it. (Adams 2007a)

> All this stuff about "this is the right way to do it," and "this is the wrong way to do it," is a waste of time. The only thing that matters is how the player perceives it in the end. (Adams 2007a)

I argued in the lecture that each of the techniques being debated had strengths and weaknesses, and successful practical application depended not upon finding a hypothetical correct way to do interactive storytelling, but upon finding the approach that most suits the designer's intentions and her player's desires. The range of possible types of interactive stories is too great for a single approach to suit them all. I do not prescribe any particular answers to the questions that a designer must face about such issues as the degree to which he should specify an avatar, or the degree of freedom and agency that he should offer to a player. Speaking to my audience as designers, I ended "Rethinking Challenges in Games and Stories" by asserting, "Only you can answer the important questions about narrative immersion, depth of characterization, coherence, credibility, if and how the player influences the plot, multiple endings, and sequels and later exploitation opportunities." (Adams 2007a)

Rather than dictate answers, my schema offers a context for thinking about the questions.

Throughout my career it has been my goal, not to subdivide and dissect interactive storytelling, but to seek common ground among the competing theories and to unify them for my own better understanding of the subject, and, when possible, to assist my colleagues and students. The schema that resolves the longstanding problems that I have described, and the template and guide for writing requirements specifications that is based upon that schema, form the primary contribution to knowledge of my work. I intend to disseminate these ideas as widely as I can in the hopes that it will reduce some of the confusion, uncertainty, and conflict that surrounds interactive storytelling in the game industry. The template and guide for writing a requirements specification that I supply in Chapter 14 offers a means for designers to document their plans in a way that, I believe, will materially benefit the industrial development process. My many articles, lectures, and books that form Volumes 2, 3, and 4 serve as additional contributions.

15.3 Future Work

As explained in section 1.2.3, this thesis has not addressed storytelling in multiplayer contexts. In the last year I have begun to consider the issues associated with offering a well-formed story to the players of a massively multiplayer persistent world. Such games are especially problematic as storytelling experiences, for the following reasons:

- In most cases the player cannot make permanent changes to the game world. Enemies are resurrected moments after the player kills them and the landscape is immutable.
- The player's experience is not unique, as thousands of other players pursue the same predefined chain of quests.
- The fictional world is often said to be in some kind of difficulty, but the player's actions do not ameliorate the problem.
- Being of indefinite duration, the experience lacks a dramatic climax.

- Many such games are implemented as role-playing games, which expose the player to the game's internal mechanics through user interfaces full of numbers. This harms narrative immersion.

(There are exceptions to some of these characterizations. *A Tale in the Desert* (2003) comes to an end, and players can make permanent changes to the landscape in *Minecraft* (2003).)

I propose that for a persistent world to feel story-like to its players, it must exhibit the properties of well-formed stories described in section 3.1.7, and the following properties as well:

- All the players collectively contribute to resolving a single global problem (the major source of dramatic tension in the story) that affects them all.
- Each player's actions are unique in the world, although there may be similarities among them. If the game offers quests, each quest must be undertaken exactly one time by one player.
- Each player's actions make a meaningful and permanent difference to the game world and the dramatic situation in which it occurs.
- The story has a beginning and an end. Resolution of the global problem serves as the dramatic climax.
- Death, either of players' avatars or non-player characters, is permanent.
- The numeric values presented to the player should correspond only to those numbers that would normally be visible imaginary world—prices of goods would be permitted, for example, but not numbers corresponding to the intelligence or dexterity of characters. The game's core mechanics should remain hidden.

In a Designer's Notebook article called "Introducing *The Blitz Online*", I described a persistent world that would address some of these issues. (Adams 2011b) *The Blitz Online* would be a limited duration role-playing persistent world for a small number

of players—hundreds rather than tens of thousands. The game would simulate the experience of civil defence workers in Britain during the period of aerial bombing in the Second World War known as the Blitz. The game, if implemented correctly, would exhibit the properties described above as follows:

- The global problem is the Blitz itself. Through collective endeavour, the players can work to keep British morale up. This is simulated as a numeric variable called the Spirit of the Blitz.

- Each player plays an avatar with unique civil defence responsibilities in a particular area of London during the Blitz. The responsibilities in a given region may only be met by the player. If the player fails to log in and play the game, those responsibilities go unmet and morale suffers. Each player may execute certain commissions (i.e. quests) that are not available to any other player.

- The game world, a 3D-modelled subset of London, continually deteriorates under Axis bombing, which lowers morale. No two bomb strikes are exactly alike, producing variation. The players take on a variety of roles to rescue victims, put out fires, maintain order, and so forth. These actions have a permanent effect on the game world and NPCs, and serve to raise morale.

- The game has a maximum duration that corresponds to the duration of the historical Blitz. However, if the players can raise morale above a certain point, the Blitz ends early, before it did historically; Adolph Hitler is said to have abandoned the effort. This is the dramatic climax of the story. The major events of the simulated Blitz correspond approximately to the major events of the real Blitz, although the dates may be changed in order to improve replayability.

- Deaths of both avatar and non-player characters is permanent. (Players may be given a new avatar, but the dead one remains dead.)

- The player would not have access to performance statistics or other numbers from the core mechanics until after the game ends.

The stated goal of the game itself would be educational, to teach players about the Blitz, but the object of the research project would be to determine whether a game meeting the criteria above would create a story-like experience for the players. The data to test this question would be collected through questionnaires and interviews with players after they had played the game.

I intend to pursue *The Blitz Online* upon completion of this thesis.

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